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THE
OPHTHALMIC REVIEW

A RECORD OF OPHTHALMIC SCIENCE

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EDINBURGH.

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A CASE OF EXPULSIVE INTRA - OCULAR HÆMORRHAGE AFTER PRELIMINARY IRIDECTOMY FOR CATARACT.¹

BY ROBERT L. RANDOLPH, M.D.,
BALTIMORE, U.S.A.

IT seems hardly necessary to preface this report with references to the literature of the subject. We all know that a number of cases of expulsive intra-ocular hæmorrhage are on record, but the case which came under my observation is of more than usual interest, and for this reason seems worthy of being brought to your notice.

Mrs. J. C. W., aged 76. She came to me two years ago for cataract extraction. The cataract was ripe in the right eye and the left lens was the seat of a number of striations which greatly interfered with her vision. She seemed in excellent health and there was apparently no reason why the operation should not be performed. She could not be induced to enter the hospital, but insisted upon remaining at home and having her sister and daughter nurse her. Under these circumstances I concluded that it would be well to perform a preliminary iridectomy and to remove the lens a few weeks later. From the uniformly favourable statistics of others and from my own experience, this measure has commended itself to me as being especially adapted to cases where the subjects

¹ Read at the Thirty-fifth Annual Meeting of the American Ophthalmological Society, New London, July 19, 1899.

are very nervous (as was Mrs. W.) and where hospital conditions are absent. The operation was perfectly smooth. A few drops of blood were left in the anterior chamber. The eye was closed. She passed a comfortable night, and the next morning the eye was opened to see if everything was right. The coloboma was found to be clean, the blood in the anterior chamber absorbed and the eyeball with scarcely a trace of redness.

On the morning of the third day I was called to her, and found that she had been suffering slight pain all night and that the eye was watering. On opening the eye it was found very slightly reddened near the incision, but away from this location there was a noticeable absence of congestion. The striking feature, however, was the almost complete obliteration of the anterior chamber. The lens had pressed so far forward that the iris was lying nearly against the posterior surface of the cornea. A cold compress was applied and kept on for twenty-four hours, but in this length of time the condition had grown worse and the lens was being slowly pushed through the iris coloboma and its upper edge was close to the corneal wound above. The next day the wound looked as though it might open at any moment, so I concluded to remove the lens. No sooner was the corneal section completed than the lens popped out with force and it was immediately followed by a mass of vitreous which was stained a deep red. The corneal flap was pushed strongly forward and it looked as though the eye were going to empty itself. On pushing the flap back with the finger the great pressure from within could be distinctly felt.

The finger was then taken away, the lid slipped over and a light compress applied. All that night she was much nauseated and the constant retching kept up the bleeding. The oozing did not cease entirely until

four days later, when on opening the lids the corneal flap was found doubled over and lying on the lower half of the cornea. A bloody mass filled the space between the lips of the wound. Light perception was gone. She had never had any pain since the operation. The flap was again replaced and in a few days the wound was closed, and three months later the eye had shrunk to half its original size.

Six months after this glaucoma appeared in the left eye, and in spite of all non-operative treatment she was blind in nine months. She was unwilling for an iridectomy, and with the history of the right eye I could not urge such a measure. Seven months ago, however, I performed paracentesis of the vitreous, and since this operation she has been entirely free of pain and this is a longer release than she has had for nearly a year. In this operation two incisions were made in the sclera, one between the external and inferior rectus muscles and one quarter of an inch posterior to the lens, and the other between the inferior and internal rectus muscles, and the same distance behind the lens. The last incision was made T-shaped, as being less likely to close completely.

Though the eye is still hard, the pain has entirely disappeared. The development of the glaucoma in the left eye justifies us in concluding that the same condition was present in a less advanced stage in the right eye at the time of the preliminary iridectomy. It is likely, too, that we had before us the hæmorrhagic variety of the disease from the expulsive hæmorrhage which followed the operation. This result contra-indicated a similar operation on the fellow eye. This is the second case in which I have seen a complete disappearance of pain after paracentesis of the vitreous in the manner described. The case is of exceptional interest, inasmuch as the hæmorrhage followed iridectomy, for as a rule such catastrophes are seen only after removal of the lens.

It is interesting to note the fact that intra-ocular bleeding apparently did not commence for hours after the iridectomy. The nature of the trouble was not suspected till the morning of the third day when the evidences of pressure behind the lens were unmistakable, so that bleeding had been going on intermittently for days before the lens was removed. The constant reduction of intra-ocular tension caused by the yielding of the eyeball at the point of the wound would explain the persistent character of the hæmorrhage. It is needless to add that we undoubtedly had in this case senile degeneration of the blood vessel walls, so strong a predisposing cause to such results.

STERILISED OPHTHALMIC DRESSINGS.

BY K. C. CHETWOOD-AIKEN, M.B.

OPHTHALMIC SURGEON TO THE ROYAL CORNWALL INFIRMARY.

BY the aid of a portable steriliser it is an easy matter in private practice to render aseptic the various instruments required for an ophthalmic operation; but to be thorough, the sponges used for removing blood, lens matter, &c., and the pads of gamgee tissue applied as a dressing, should equally be placed beyond suspicion—and this is less simply brought about.

The following method will, I think, be found to answer the purpose, besides being a great saving of time and trouble. I am well satisfied with the manner in which Messrs. Ferris and Co. of Bristol have carried out my instructions.

A number of circular pads of absorbent tissue are cut and placed in a tin, each pad being separated from its fellow by a leaf of paper. To these is added a tray containing "swabs," or sponges made of small

rolls of lint ; the whole being then placed in a suitable steam steriliser. Here a pressure of 20 lbs. and a temperature of 120° C. to 130° C. is produced, and maintained for a sufficient time to ensure absolute sterilisation. The tins are then removed and hermetically sealed.

The form of tin employed is similar to that used by Messrs. Wills and Co. for putting up tobacco and cigarettes, and is opened in a like manner by a cutter in the cover. Each contains twenty pads and a sufficient number of swabs for an operation.

By this means the surgeon procures his dressings ready cut, sterilised, and packed—a great convenience in emergency operations—the pads retain their shape and do not adhere to one another, and each can be removed singly without touching the remainder.

The price of the tins is 18s. per dozen, and the makers are Messrs. Ferris and Co. of Bristol, from whom they can be obtained.

REVIEWS.

CH. ABADIE (Paris). The Nature and Treatment of Zona. *Arch. d'Ophthalmologie*, May, 1899.

The commonly accepted view as to the nature of zona is that of a trophic lesion due to changes in the sensory nerves, "the cutaneous manifestation of a neuritis." Brissaud, noting that the cutaneous area involved did not invariably correspond to the anatomical distribution of the affected nerve, suggested that the lesion was spinal, and that the eruption involved an area of skin innervated by a segment of the spinal cord.

Abadie discountenances both these hypotheses, and advances arguments in favour of the theory that zona is

due to a pathological condition of the arterioles and the vaso-motor nerves, in the cutaneous area over which the eruption appears. Generally speaking, the arterial supply to the skin follows the sensory nerves, at least in a portion of their course, and this is the reason why the eruption in zona, occupying really the vascular territory, has been considered as occupying the nervous territory. As in places these two areas are not identical, apparent anomalies in the distribution of the eruption occur, which Brissaud endeavoured to explain in the way referred to above.

As indicated by its name, zona ophthalmica affects the territory of the ophthalmic division of the fifth nerve. The eruption extends vertically on the forehead near the median line, apparently along the frontal branch of its sub-divisions, and occasionally involves the area of the nasal branch.

If the affection be an inflammation of the trigeminal nerve, how are we to explain why only one of its divisions (and always the same division) should exhibit cutaneous lesions? Why do the superior and inferior maxillary branches escape, why should the skin supplied by them never be invaded by the eruption?

Abadie maintains that all these anomalies can be explained by his theory. According to it, the skin lesions should appear in the areas supplied by the supra-orbital, frontal and (sometimes) nasal *arteries*, and this he says is what actually occurs.

Accompanying the intra-cranial part of the trigeminal trunk are filaments of the sympathetic system which come from the carotid plexus, and are derived from the superior cervical ganglion. They extend along the branch of the ophthalmic artery, to their termination.

Abadie argues that if a morbid inflammatory process affects the trigeminal nerve, or the Gasserian ganglion, it must involve the sympathetic filaments accompanying the nerve trunk; inflammatory irritation of these vaso-motor nerves will be followed by changes in the arterioles of which they regulate the calibre. This vaso-motor disturbance is, according to the writer, sufficient explanation, both

of the seat of the eruption, which does not accurately follow the area of nerve supply, but the vascular area, and of the trophic lesions of zona ophthalmica.

The vaso-motor nerves accompanying the second and third divisions of the trigeminal nerve have a different origin from those of the ophthalmic division, and do not emanate from the superior cervical ganglia. They have no intra-cranial course, and hence are not implicated by morbid processes affecting the trunk of the fifth nerve. This is the reason why herpes is not met with in the area of distribution of the superior and inferior maxillary nerves.

Abadie finds support for his views in the fact that herpes zoster thoracica does not affect the first and second intercostal spaces. The arteries of these spaces come from the subclavian, whereas the arteries to the remaining spaces are derived from the aorta. The vaso-motor supply is therefore different.

The only statement made as to the treatment of zona is that the most efficacious remedy in the ophthalmic variety is quinine, a drug which is essentially vaso-constrictor in its action on the sympathetic.

J. B. L.

L. HOWE (Buffalo, U.S.A.). A Compound Microscope for Viewing the Eye. *New York Medical Journal*, June 17, 1899.

Howe suggests that the instrument he describes might be called a kerato-iridoscope, that being a little more convenient than to speak each time of "the large horizontal microscope arranged for viewing the anterior portion of the eye."

The objective consists of two systems. The front or distal lens has a diameter (clear aperture) of 3.2 cm., the proximate lens a diameter of 5.1 cm., and they are separated from each other about 8 cm. The two systems combine to give a focal distance of about 12 cm. and an angle of aperture of about 35 degrees. There are two eye pieces. One has a focal length of about 9 cm., and gives

a minimum amplification of 20 diameters to a maximum of about 50. The other eye piece has a focus of about 2.5 cm., giving a minimum amplification of about 50 diameters, or a maximum of about 125, according to the position of the draw tube. The microscope is mounted horizontally on a firm tripod attached to an upright bar. As this bar can be lengthened or shortened, the microscope can be raised or lowered, and it swings horizontally on the axis of the bar. There is a hinge joint allowing the elevation or depression of the tube at any angle, and by means of a rack-and-pinion adjustment it can be pushed forward or backward. In a word, the microscope can easily be brought into any position desired.

When an examination is being made, the patient faces the instrument, the eye being approximately near the focus of the objective. The results are better if the chin is placed on a head rest, such as is provided for the perimeter; or, still better, if the whole head is also steadied by such a head rest as was suggested by Stevens for his "tropometer." The results are also more satisfactory if the illumination is good. Ordinary daylight is sufficient for most purposes, but if especially good views are desired these can be obtained by bringing a shaded electric light within a foot or two of the patient's head, or by allowing the light coming through a double-convex lens to fall obliquely on the eye.

Howe finds the instrument useful when observing the physiological variations in the size and form of the pupil, and the pathological alterations of its reactions, as well as for studying pathological conditions of the iris and cornea, *e.g.*, œdema of the iris and corneal ulceration. It is also of value for photographing the anterior portion of the eye.

The reviewer has had an opportunity to try this microscope, and finds it valuable for the clearness and excellent illumination of the magnified image it gives; and the ease with which any special part to be observed is kept within the field of the instrument, even without a head rest of any kind. These good qualities, which make the instru-

ment more serviceable than its predecessors, appear to depend on the large size and optical excellence of the objective, and the universal joint by which the microscope is connected with the column which supports it.

E. J.

GRADENIGO (Turin). The Value of an Ophthalmoscopic Examination in Intra-cranial Complications of Ear Disease. *Annali di Ottalmologia*, iii.-iv., 1899.

Of late years the clinical observer cannot fail to be impressed by the number of instances in which eye symptoms come to count for much in the investigation of cases in which cerebral complications follow ear disease. When symptoms are scanty or equivocal one is apt to be lulled into a false security, and not to intervene during the period in which active interference is most likely to be successful, a clear understanding of the dangers which may be imminent is therefore very desirable. The chief intra-cranial complications of ear disease are pus formation extradurally, septic thrombosis of the sigmoid sinus, cerebral abscess—usually in the temporo-sphenoidal lobe, cerebellar abscess, and meningitis; and in recorded cases of such Gradenigo is struck with the neglect of surgeons to enquire into the ophthalmoscopic condition, since information so valuable in these conditions is thus not obtained, which might have enabled the careful practitioner to arrive at his precise diagnosis earlier, to treat more skillfully, and so perhaps to avoid a fatal issue. The morbid appearances in the fundus may be of various degrees of intensity, from simple hyperæmia to choked disc or optic neuritis; the condition is usually bilateral, though sometimes most manifest on the same side as the original ear mischief, and is not necessarily accompanied by any visual disturbance—a fact which cannot be too frequently brought under the notice of practitioners. The occurrence of ophthalmoscopic changes is of importance in another way,

for the improvement in the fundal appearances, the gradual diminution of the congestion, &c., forms one of the most valuable gauges of the success of the operative measures employed. The presence of ophthalmoscopic changes must be regarded as indicating practically with certainty that the lesion has passed the limits of an external disease and has invaded the cranial cavity, though some authors maintain that a simple mastoiditis is capable of setting up optic neuritis. It can hardly be seriously objected that in the very rare cases in which operative interference failed to discover any intra-cranial damage, such a condition was actually present but was not recognised, nor on the other hand that the existence of neuritis was a mere coincidence. A second fact of great importance in this relation, too, is that the absence of optic neuritis must not be taken as indicating the absence also of intra-cranial mischief, since—though for what reason we are still ignorant—optic neuritis is only present in a certain proportion of such cases. We are still to a great degree in the dark as to why optic neuritis ever manifests itself in certain of the cases, and why not in others which seem alike in all essential particulars. We know that a large abscess pressing much upon the dura, and more particularly upon the sinus, of long duration and with imperfect drainage or none, is vastly more certain to produce ophthalmoscopic changes than one with opposite characteristics, but there are other elements which must enter into the calculation, notably, it seems, the virulence of the infective agent, the existence of hydrocephalus, individual variations in the cerebral circulation and in the structure of the peripheral portion of the optic nerve, and also the general condition of health of the patient.

Gradenigo has collected records of 635 cases, including 74 of his own, in only 172 of which the condition of the fundus is definitely stated, and out of these only 90 (52·3 per cent.) exhibited any alteration of the fundus. Papillitis was diagnosed with fairly equal frequency among the cases of cerebellar abscess and of septic thrombosis of the sinus, in about 60 per cent. of the cases in which these

conditions were present: in 53 per cent. of the cases of cerebral abscess: in 49 and 41 per cent. respectively of those of meningitis and extra-dural abscess. He does not pretend that these numbers can be taken as of universal application, for the variations in frequency among different series are very striking; thus Jansen in one series of cases of thrombosis found papillitis in 53.5 per cent., but in another only in 31 per cent. Another cause of error in such statistics is the occurrence, by no means rare, of two or even more lesions at the same time; thus one patient may have both an extra-dural abscess and a thrombus of his sinus, and how is one to decide to which of these conditions his optic neuritis is due? Gradenigo thinks, however, that one may take it that papillitis is present in about one-half of all the cases of intra-cranial lesion following ear disease. The ocular symptoms reach their maximum importance in those of extra-dural pus formation because it is of vast importance that such should be diagnosed and treated before invasion of the brain tissue, and as is well known, their symptoms are sometimes somewhat equivocal. His view is that in presence of optic neuritis in a case otherwise doubtful, immediate operation is the only permissible line of treatment. It is manifest that the presence of optic neuritis gives no indication as to the precise nature of the intra-cranial alterations.

W. G. S.

F. H. VERHOEFF (Baltimore, U.S.A.). **A New Instrument for Measuring Heterophoria and the Combining Power of the Eyes.** *Johns Hopkins Hospital Bulletin*, May, 1899.

The instrument consists essentially of four mirrors, two for each eye, arranged one above the other, and mounted in a rectangular frame so as to rotate on axes. The axes of the two upper mirrors are in the same line; and are parallel to the horizon and perpendicular to the direction of sight. The axes of the lower mirrors are parallel to each other and lie in planes perpendicular to the horizon

and parallel to the direction of sight. The distance between the two lower axes is 6.25 cm., which closely approximates the average distance between the eyes. The lower mirrors are made as large as is possible without their interfering with one another. The upper mirrors are of the same size as the lower except perhaps a little longer. A good size for the lower mirrors is 3 cm. \times 5.5 cm.; and for the upper mirrors 4 cm. \times 6 cm. In Verhoeff's model the axes of the upper mirrors are 5 cm. above the middle points of the axes of the lower mirrors, but this distance is unnecessarily great. The axes of the lower mirrors are at an angle of 45 degrees to the vertical. One of the upper mirrors is permanently set at an angle of 43 degrees to the vertical, while the other is freely movable about its axis.

Light from a distant point, as a candle flame, is allowed to fall on the upper mirrors, which reflect it upon the lower, and these reflect it upon the patient's eyes. If the mirrors are all parallel, the rays after the double reflection are still parallel to their original direction; and the point of light from which they come appears almost in its true position, only being displaced downward by the distance of the lower below the upper mirrors. If, however, one of the upper mirrors be slightly rotated about its horizontal axis, the image seen by means of it will be displaced vertically; and the rotation of the lower mirrors about their axes will cause lateral displacements of the images of the point of light. With each of the movable mirrors is connected an index or "lever," which shows on a graduated "dial" the extent of the angular displacement of the images, the zero of the graduation indicating that the test object appears in its true position. The mirrors are enclosed in a box having a window for each of the patient's eyes; and a shutter is arranged by which first one eye and then the other can be excluded in rapid alternation.

To use the instrument, the patient is directed to sit down behind it, place his eyes on a level with the windows, and look through them at a circular spot, which should be at a distance of about twenty feet. The levers are then

placed at zero on both dials and the shutter is moved to and fro at a moderate rate of speed. The patient is now asked to state whether the object seems to move or not. If not, his muscle balance is perfect. If he sees the object apparently moving obliquely, the outside lever, that is the lever attached to the upper mirror, is moved until the patient says the movement is horizontal; and then the middle lever is adjusted until there is practically no movement. The outside lever will then register the amount of hyperphoria, while the middle lever registers the amount of exophoria or esophoria, according as it is below or above the zero point.

If now it is desired to measure the relative abduction or sursumduction of the eyes, that is the combining power of the eyes, the shutter is opened and the patient directed to look through the mirrors with both eyes. He will then see the object single, and without effort, since his heterophoria has been corrected by the previous adjustments. The lever connected with lateral rotation is now depressed until the patient, by the greatest effort that he can make, is just able to fuse the images. The dial will then register the number of degrees of abduction. Similarly the amount of adduction, and of right and left sursumduction, may be obtained.

In addition to the test with the shutter, the amount of heterophoria may be estimated by this instrument in a manner similar to that adopted when prisms are used. To do this all that is necessary is to produce vertical or lateral diplopia by the levers, and then move the proper lever until the images are in line. It is well to use this test as a confirmation of the shutter test.

Another very important use to which the instrument can be put is to give gymnastic exercise to the eye muscles. By moving the lever, the patient himself can do this, not by jerks as with ordinary prisms, but smoothly as with the rotary variable prism.

E. J.

E. VALUDE (Paris). Bactericidal Action of the Tears. *Annales d'Oculistique*, September, 1899.

The generally accepted opinion that the lacrimal fluid is not a good medium for the development of pathogenic bacteria (even if it does not actually possess true bactericidal powers), rests on data supplied mainly by the researches of Bernheim, Bach and Ahlström.

Bernheim states that the lacrimal fluid, provoked by the use of ammonia, prevents microbes developing, and can even destroy many of them.

Bach, while recognising the fact that tears can destroy the staphylococcus aureus, thinks that the lacrimal fluid acts chiefly in a mechanical way by constantly sweeping over the conjunctival surface.

Ahlström, having collected tears from a lacrimal fistula, found that they did not destroy the staphylococcus aureus, and concludes that they are not directly bactericidal, but merely form a bad medium for the development of microbes.

M. Valude himself, in *Etudes sur la Tuberculose* (1887), proved that tubercle bacilli could not be inoculated on the conjunctiva if they were neutralised by contact with tears.

Being afforded an opportunity of obtaining a fairly large quantity of the lacrimal fluid in a pure condition, M. Valude undertook (with the aid of M. Dubrief, chief pathologist to the Clinic of Quinze-Vingts), the series of interesting experiments which form the material of his article.

In a certain patient he resected the palpebral edges for epithelioma (including the puncta and canaliculi), and then sutured the remnants of the lids together to protect the globe; the patient returned in eighteen months, free of the epithelioma, but having in front of her eye a large fluctuating tumour, due to the distension of the adherent lids by the tears. Here, in a hermetically sealed and, as was found afterwards, healthy conjunctival sac, was a considerable quantity of the lacrimal fluid. With the most careful antiseptic precautions the fluid was removed from the sac, and was found to be colourless,

translucent, with an opalescent appearance as if some very thin flakes were in suspension, and slightly alkaline. The fluid became clear on standing, the flakes collecting at the bottom. In all, about twenty-two cubic centimetres were so obtained.

Microscopical examination, made immediately, showed no organised or crystalline body to be contained in it, only floating in the liquid were some "amorphous granulations," whose nature could not be exactly determined. Chemical examination showed that the liquid was undoubtedly normal lacrimal secretion; and its sterility was proved by the fact that broth remained without a trace of culture fifteen days after receiving a drop of the fluid. Moreover, the pipettes containing the original fluid were placed for fifteen days in the oven at 30° C. and none were changed. At the bottom of each pipette, however, there was the white powdery deposit which had appeared on the first day when the fluid was allowed to rest. This was composed of the "amorphous granulations."

It was found that when exposed in company with urine and nutritive broth, these two swarmed with bacteria on the fourth day, while the lacrimal fluid on the tenth day showed only two silky tufts of a mould which has not been determined. Hence the lacrimal fluid is a bad medium for cultivating bacteria, though it may lend itself fairly well to the development of moulds.

In the next series of experiments the bacillus anthracis was made use of. Though it is not found in ocular affections, still its invariable effects when inoculated and its great sensitiveness to preventive or destructive agents induced him to employ it. From a series of experiments made, M. Valude arrives at the following five conclusions: (1) the bacillus anthracis cannot develop in the lacrimal fluid; (2) the adult bacilli, on being plunged into the lacrimal liquid for some days, lose the capability of growing in nutritive broth; (3) if spores of the bacillus anthracis are left for fifteen days in lacrimal fluid, they lose the faculty of growing in nutritive broth and become non-pathogenic for guinea pigs; (4) heating for eight hours

at 50° C. does not destroy this power of the lacrimal fluid; (5) heating for more than two hours at 85° C. prevents the lacrimal fluid acting.

Briefly put, then, the lacrimal fluid is a very bad medium for the culture of the bacillus anthracis, for even over the spores the fluid possesses an incontestable bactericidal power; and prolonged heating above the point of albumin coagulation causes the disappearance of this bactericidal power.

The next bacillus used was the coli bacillus, and by a series of experiments—extending in some cases to more than a month's duration—M. Valude arrived at the following conclusions:—The lacrimal fluid allows the coli bacillus to develop, if a large quantity of a culture is used, but the micro-organism does not find in the fluid a favourable medium, for it loses some of its vitality and some of its biological properties, especially if it has been left for some considerable time in contact with the fluid.

Neither the staphylococcus aureus nor albus can develop at all well in the fluid; and after a certain time of immersion (eight days in the case of the former, thirty in the case of the latter) the microbe loses its power of developing even when transferred to a very nutritious medium.

M. Valude's experiments regarding the action of the lacrimal fluid on the tubercle bacillus require a more detailed account.

In the first experiment a pipette of lacrimal fluid was inoculated with a particle of tubercular culture; at the same time a Pasteur bulb containing glycerine and glucose bouillon was similarly inoculated, and these, with the culture tube, were then placed in the oven. At the end of a month no culture appeared in the pipette, which was left for fifteen days more in the oven without result; in the Pasteur bulb, a thin pellicle of bacilli had formed on the surface; in the original culture tube the growth appeared to have increased. On the forty-fifth day one guinea-pig received in its peritoneum the entire contents of the pipette, and another, the emulsion of the original tube. Two months after the inoculation both guinea-pigs were

in good health, and on being killed exhibited no tubercular lesions. In consequence of this, M. Valude concludes that he was dealing with a microbe which retained its power of growing on artificial media (and this was prevented by the lacrimal fluid), but which had lost its virulence for guinea-pigs.

Starting afresh, he obtained some tubercular material by aspirating it from iritic growths. Part of this material was placed in a pipette of lacrimal fluid; some of it was examined microscopically, and showed numerous bacilli of Koch; and some of it was diluted by addition of one cc. of distilled water, and inoculated in the peritoneum of a guinea-pig, which died of generalised tuberculosis on the thirty-fifth day. The pipette containing the lacrimal fluid and the tubercular material was kept at the temperature of the laboratory (about 20° C.) shut up in a small metallic sterilised box and protected from the light for fifteen days and then diluted with two cc.'s. of distilled water; it was inoculated into the peritoneum of a second guinea-pig. This guinea-pig remained well for three weeks, but died fifty-four days after inoculation from a generalised tuberculosis. Arguing from the delay before the death of the second guinea-pig (*i.e.*, three weeks), M. Valude concludes that the lacrimal fluid has some certain modifying action on tubercle bacilli. Moreover, as he has already pointed out, one cannot implant tubercle bacilli on the conjunctiva of the rabbit, if they have previously been exposed to the action of the tears. Hence M. Valude concludes in a general way, that the lacrimal fluid is certainly a bad medium for cultivating micro-organisms, and that it is capable of neutralising the virulence of some of them, *e.g.*, the bacillus anthracis, the coli bacillus, and to some degree the staphylococcus aureus.

Finally the question of the bearing of the alkalinity or acidity of tears on their bactericidal powers is touched on. Both Ahlström and Lusic Matkowic consider that the less alkaline tears are, the more are they endowed with bactericidal power; while on the opposite side Charrin states that diminished alkalinity of the natural secretions

"lowers their bactericidal power;" the lactic acid produced in the tissues by over-exertion in this way predisposes, he says, to bacterial infection, and the influence of diabetes upon the tissues is similar.

M. Valude states that he is inclined to the opinion that when the tears give an acid reaction before operation there is a predisposition to accidents of post-operative infection. He is pursuing a series of experiments in this direction, and for some time past has been in the habit of testing the lacrimal fluid of cataract cases by means of turnesol. Of eighty cases in which the reaction was acid, three showed post-operative infection chiefly affecting the iris. The eyes were not lost and the vision was fair; in one of the cases the staphylococcus albus was found in the secretion, but no streptococci.

He seems to suggest also that acidity of the lacrimal secretion may be the cause of the chronicity of certain cases of rebellious conjunctivitis.

FRANK C. CRAWLEY.

E. HERTEL (Jena). The Influence of Cold and Warm Compresses on the Temperature of the Eye. *Von Graefe's Arch.*, xlix., 1.

The effect of cold and warm compresses on the temperature of the eye has very seldom been the subject of special investigation. In a paper published in 1893, Silex comes to the conclusion that compresses applied in the usual way, three times a day for a quarter to half an hour at a time, raise the temperature of the conjunctival sac if they are colder than the surrounding atmosphere, and lower it if they are warmer than the atmospheric air. In 1894, Giese repeated Silex's experiments and came to diametrically opposite results; he found that cold compresses lower, hot compresses raise the temperature of the conjunctival sac.

Since that date no further attempt has been made to settle the question, and in order to come to a certain

finality about it the author has instituted a large number of experiments in this direction. He used two thermometers of special form calculated to eliminate any error from evaporation.

The compresses were all uniform in shape and thickness, the liquid used being water with a small addition of boric acid—not exceeding 2 per cent.—at the following temperatures: 32° F., 58° F., 132° F. They were renewed very frequently, and the experiments were conducted in rooms which were kept at an equable temperature between 64° and 68° F.

The temperature of the normal conjunctival sac was found to vary between 95.4° F. and 97.2° F., or on the average 95.9° F., with a medium temperature of the body of 100.2° F., giving the difference between the temperature of body and conjunctival sac as 2.5° F., which figures agree very well with those obtained by other authors.

In his experiments hot compresses invariably effected an increase, cold compresses a decrease of the temperature of the conjunctival sac. The increase through warm compresses ranges from 1.6° to 2.9° F., and reaches its maximum value after about ten minutes, when it becomes stationary under continued hot compresses. With iced water the decrease of temperature ranges between 3.8° and 8.5° F., and again becomes stationary after from ten to fifteen minutes under continued application of the iced compresses. After the removal of the compresses the thermic effects disappear with almost equal rapidity, and in about seven minutes the sac has returned to its original temperature.

The next step was to ascertain how the thermic effect was to be accounted for, whether directly by conduction, or indirectly by changes in the circulation of the blood. For this purpose experiments were made on the rabbit after establishing the fact that under normal conditions, *i.e.*, with normal circulation, the effect of the various compresses on the conjunctiva of the rabbit is the same as in man.

Hyperæmia of the eye of the rabbit was produced by

dividing the sympathetic nerve, anæmia by stimulating its distal end. The hyperæmia produced an increase of temperature of 1° F., the anæmia a decrease of from 0.75° to 1.7° F. It was found that neither the hyperæmia nor the anæmia had any noticeable influence on the effect of the compresses.

Compression of the internal carotid in the rabbit led to the same result, viz., that the same maximal effect on the temperature of the conjunctival sac can be produced by the application of compresses of equal temperature, both in normal or in abnormal conditions of the circulation of the eye. These effects being once produced, there is no influence noticeable from any subsequently established circulatory changes.

Experiments with freshly killed animals showed that while in the living tissue a certain maximum effect cannot be exceeded (by applying compresses of a given temperature), this limit can be exceeded if the circulation of the blood is stopped either temporarily or permanently.

The author comes to the conclusion with regard to applied heat (and cold), that the temperature of the conjunctival sac is influenced by the conduction through the tissue, for which conduction the anatomical conditions are very favourable.

Neither the dilatation of the blood-vessels by heat nor their contraction by cold has any influence on the change of temperature, nor has the alteration of circulation anything to do with it, whether it is caused by mechanical compression of the blood-vessels or by the intervention of nervous influence. An influence on the part of the circulation is observable only in so far that the effects of conduction of heat are limited by the extent to which the heated or cooled blood is removed by the circulation. The conditions in the pathologically affected eye were found to be quite analogous to those of the normal eye, and seem completely to corroborate the author's view on the effect of the various compresses on the eye.

The author finally investigated the influence of compresses on the temperature in the orbit. The experiments

were made on the rabbit with the help of a specially shaped thermometer which was introduced into the orbit, and placed as nearly as possible in contact with the posterior pole of the eyeball. The normal temperature in this situation was found to be 100.9° F., as against the temperature of the body of 101.3° F. The maximum decrease after ice water compresses was 9.7° F., and was reached after about three minutes; the maximum increase after hot compresses was 2.9° F. after four minutes.

It appears therefrom that the thermal effects of compresses is exactly the same on the region immediately behind the eyeball as on the conjunctival sac, and that they must be attributed in both cases to the same physical laws of conduction.

K. G.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, DECEMBER 14, 1899.

Mr. A. QUARRY SILCOCK in the Chair.

CLINICAL EVENING.

(1) *Congenital Subluxation of the lens: secondary luxation forwards: operation: result.*—Mr. George Keeling.

The patient, a girl of 20, had congenital displacement of both lenses upwards and outwards, associated with a high degree of myopia. The left lens subsequently became luxated into the anterior chamber. Increase in tension supervening, needling was attempted, which was to have been followed by paracentesis. Needling, however, could not be performed, as the toughened capsule became invaginated before the point of the needle, and later on the lens was extracted with the scoop through a corneal incision, with the satisfactory result that the vision became improved to $\frac{5}{8}$ with $+ 12.0$ D. sph.: $+ 1.0$ D. cyl.: R. E. vision with $- 20$ D. sph.: $\frac{6}{32}$.

Mr. Spicer raised the question whether it were advisable, in cases of congenitally displaced lenses, with toughened capsule, to fix the lens from the back, during the operation of discission, with a needle passed through the sclerotic.

The Chairman said that in the last case he operated upon the circumference of the lens was practically across the centre of the pupil. He was prepared to fix the lens from the back, but in this case the capsule was not very dense, and he had no difficulty in dividing it with a very fine needle.

(2) *Case of Sympathetic Ophthalmia coming on 47 days after Enucleation of Injured Eye.*—Dr. Cecil Shaw (Belfast).

The patient, a healthy girl of 19, had a perforating wound of the left eye, May 24, 1899. On June 28 the eye was enucleated—it being injected and painful, vision *nil.*, T. minus. According to a very definite history the sight of the right eye remained perfectly good till August 14, when suddenly the eye became painful and injected—iridocyclitis supervened, and now the vision is reduced to only perception of light.

The Chairman thought it was conceivable that the cyclitis might have existed for some time before the patient noticed that her remaining eye was affected.

Mr. Treacher Collins questioned whether the inflammation in the second eye were really caused by the injury to the first, or if it were an independent attack of inflammation. He quoted a case of his own in which suppuration occurred after an injury with a thorn, and the eye was enucleated within four days of the accident. Eight months later the patient came back with iritis, vitreous opacities and punctate deposits on the cornea of the other eye. He considered that in this case the attack of iridocyclitis was quite independent of the injury.

(3) *Case of Sarcoma of the Upper Conjunctival Cul-de-Sac: operation: recurrence.*—Mr. John Griffith. The patient, a woman of 45, said that the tumour was first noticed by her doctor last Christmas. The diagnosis of sarcoma having been verified microscopically, the growth was freely excised in the early part of the year. The recurrence was first noticed in November. The eye-ball itself was pigmented, a fact which had been noted at least eighteen months before the discovery of the tumour.

The Chairman said he thought that the diffuse subconjunctival pigmentation was unusual.

Mr. Devereux Marshall said he had seen a case of subconjunctival pigmentation which had been noticed some months before the occurrence of an orbital sarcoma.

(4) *Macroscopic and Microscopic specimens of Mr. Work Dodd's case of Retinal Detachment shown at the last meeting of the Society.*—Mr. John Griffith. The specimens show an intra-ocular non-pigmented spindle-celled sarcoma.

(5) *Nasal Duct Dilator.*—Mr. G. Darell Maynard. The dilator

consists of a split steel tube, through which runs a fine rod with a bulbous extremity. When the two halves of the tube are in apposition, the bulbous extremity projects from the lower end of the tube. By turning a screw at the upper end, the bulb can be drawn up, thus separating the two halves of the tube. The size of the dilator closed is equal to No. 2. Bowman's bulbous probe; when fully dilated it is equal in diameter to No. 7.

Mr. Maynard finds that the instrument is easily introduced, and dilates strictures very satisfactorily, causing little pain and practically no bleeding.

(6) *Case of Long Persistent Membranous Conjunctivitis*.—Mr. Silcock and Mr. G. D. Maynard.

(7) *Extensive Scleral Wound in Ciliary Region*.—Suture, recovery.—Mr. Silcock and Mr. G. D. Maynard.

The patient, a girl aged 13, was admitted to the Royal London Ophthalmic Hospital with severe injury to both eyes from the bursting of a bottle.

In the right eye there was a vertical wound of the sclera in the ciliary region, with ciliary body and vitreous presenting. In the left was an oblique wound at the lower border of the cornea with prolapse of iris. The scleral wound of the right was closed by sutures, care being taken to pass the needle only through the superficial part of the sclera in the left. The prolapsed iris was excised. Both wounds healed very satisfactorily, and eventually good vision was obtained.

R. V. with correction $\frac{6}{12}$ and J1. L. V. $\frac{6}{12}$ and J1.

(8) *Macular Changes*.—Mr. A. Stanford Morton.

(9) *Embolism of Central Retinal Artery*.—Mr. A. H. Thompson showed a case of embolism of the central artery in which a triangular area of the retina running from the disc towards the macula escaped degeneration. At the onset this area was seen to be red, as well as the macula, in contrast with the surrounding pale retina. A minute cilio-retinal vessel could be seen running outwards from near the margin of the disc over this area.

(10) *Changes in the Macular Region following a Blow on the Eye*.—Mr. G. Brooksbank James.

(11) *Vascularity of Lens Capsule, probably Congenital*.—Messrs. Brailey and Ormond.

(12) *Growth on Palpebral Conjunctiva occurring at Site of Incision of an Old Meibomian Cyst (? Epithelioma)*.—Mr. Cargill.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

THIRTY-FIFTH ANNUAL MEETING, HELD AT NEW LONDON,
CONNECTICUT, 1899.

Dr. O. F. WADSWORTH, BOSTON, PRESIDENT.

Reported by Dr. T. B. Schneideman.

An Office Stereoscope.—Dr. R. H. Derby (New York) presented such an instrument. It is provided with a ratchet for changing the lateral and vertical position of the test objects. It has a scale at the back to show the separation of the images. The instrument is intended for ordinary orthoptic exercises. It is also useful in detecting deviations of the visual lines.

A New Phorometer.—Dr. Frederick H. Voerhoff (Baltimore), by invitation, exhibited a shutter phorometer (see *Johns Hopkins Bulletin*, May, 1899). He also described experiments made with the instrument showing that cyclophoria does not occur; psychical fusion accounts for the phenomena without actual torsion of the eyeball taking place (see p. 11).

Congenitally Inefficient External Rectus and Binocular Vision.—

Dr. J. O. Tansley (New York): Two cases. CASE 1.—The right eye could not be brought outwards beyond the middle line; there was single binocular vision in every part of the left field; diplopia directly in front which increased the farther the test object was carried outward. The vision was $\frac{2}{8}$, which became full with — 1.5 D. A slight tenotomy was performed which left the conditions nearly unchanged.

CASE 2.—The patient always sees double when looking directly in front or to the left. No pain in use of eyes. The left eye could not be brought beyond the middle line. The right eye has perfect motion. The vision in the right eye equals $\frac{2}{8}$ with a low + sphere; left eye $\frac{2}{10}$; not improved. The ophthalmoscope showed no lesion in either eye.

Fields.—That of the right eye was remarkably good. That of the left eye was cut off 15° on the nasal side.

Diagnosis.—Congenital insufficiency or absence of the external recti. The impaired mobility was not due to bands restraining the motions of the eye, for in that case it would be impossible to account for the power of motion in other directions.

A Case of Primary Tumour of the Optic Nerve.—Dr. F. Buller (Montreal) reported a case in a boy aged 6 years. The history indicated that the growth was probably of congenital origin. No other member of the family was affected. At the age of 3 months

a faulty position of the eye was noticed. It was soon after observed to be enlarged. At 4 years of age the enlargement appeared to undergo rapid increase. At the same time he had a single attack of convulsions. Subsequently he had attacks of terror, but no more convulsions. At the time of examination there was proptosis of the right eye to the extent of half an inch or more. The eye was not much altered in its movements. The lids rested on the equator of the eye, leaving the anterior segment always uncovered leading to a certain degree of inflammation. The posterior media were clear. The fundus was quite well seen. The nerve was bluish; vessels small; palpation revealed a mass behind the globe. At the operation, which finally required removal of the eyeball, the growth was found to fill the apex of the orbit completely. Its dimensions were 7 by 10 mm. The microscope showed the tumour to be a myxosarcoma. The reporter had seen three cases in twenty years out of 45,000 ophthalmic cases.

A Case of Primary Non-pigmented Sarcoma of the Left Upper Lid.—Dr. C. A. Veasey (Philadelphia) reported a case in a male, 45 years of age. The tumour was first observed about four months before the examination. It gradually increased in size and at the time of removal was 12 by 9 mm., ovoid in shape, closely resembling a chalazion except in colour. There were attachments to the over-lying skin, but it was freely movable over the underlying tarsus, and its colour was comparable to that of well diluted claret. Microscopical examination showed it to be a non-pigmented spindle-celled sarcoma, having its origin in the subcutaneous muscular tissue over the tarsus.

An Instrument intended to Facilitate the Operation of Capsulotomy.—Dr. F. Buller (Montreal) called attention to the difficulty of obtaining a cross section on account of the loss of tension which the capsule undergoes after the first cut is made. To obviate this he has devised parallel double needles, each 1.25 mm. in diameter, which are intended to be introduced into the eye to render the capsule tense by pressure. The membrane is then to be divided by an ordinary capsulotome.

Dr. Myles Standish (Boston) advocated capsulotomy soon after the original operation. Even in cases where iritis was present he had seen the inflammation subside after the tension upon the iris had been relieved by the operation.

A Case of Expulsive Intra-Ocular Hæmorrhage after Preliminary Iridectomy for Cataract.—Dr. R. L. Randolph (Baltimore) reported a case (see p. 1).

Dr. Carmalt (New Haven) inquired as to the condition of the kidneys.

Dr. Millikin (Cleveland) had reported an instance of hæmorrhage in a case with increased tension six days after extraction which resulted finally in retention of some degree of vision.

Dr. Randall (Philadelphia) was inclined to believe that such an occurrence is comparable to an outbreak of glaucoma in the second eye after an operation upon the first.

The President referred to a case of his own, showing that considerable hæmorrhage is not necessarily fatal to vision. In this case he interrupted the operation on account of hæmorrhage. It was subsequently successfully completed by a colleague.

Some Unusual Cases of Secondary Glaucoma.—Dr. Charles S. Bull (New York) called attention to the connection between renal disease and retinal hæmorrhage as antecedent to hæmorrhagic glaucoma, and reported several cases.

Dr. Prout (Brooklyn) suggested that a knowledge of the subsequent history of the patient, especially of the cause of death, may throw light on the origin of glaucoma in a given case.

The President referred to a case of retinal hæmorrhage in an individual showing no evidence of general disease. A year later, the patient had glaucoma. The eye was finally enucleated. The second eye underwent similar loss of sight. Sclerotomy was done, followed by enucleation. The patient lived ten years longer without developing chronic disease, and finally died of acute pneumonia.

Dr. Howe (Buffalo) called attention to the element of heredity in glaucoma, referring to a family in which he had operated upon five members in two generations.

Dr. Mittendorf (New York) stated that he had also seen cases of hæmorrhagic retinitis followed by glaucoma.

On Anomalies in the Epithelial Layer of the Crystalline Lens and Anterior Polar Cataract.—Dr. A. Alt (St. Louis), after referring to the ordinary views as to the origin of anterior polar cataract, stated that a pre-existing malformation of the lens was necessary for its occurrence, basing this opinion upon the results of microscopical examination of the lenses of four eyes with pyramidal cataracts. Each of these cases showed extensive disturbance of the capsular epithelium.

An Electro-Magnet for the Removal of Iron or Steel from the Eye-Ball.—Dr. W. B. Johnson (Patterson) presented a powerful electro-magnet for the removal of iron or steel from the eye-ball through the point of entrance, and reported three cases. The foreign bodies are drawn to the opening and thus removed.

Dr. Howe (Buffalo) referred to the difficulty of extracting the

foreign body after it has reached the wound, the edges of which are apt to scrape it off, and inquired how that is overcome.

Dr. Rider (Rochester) called attention to the possibility of more than one foreign body lodging in the eye through one wound. He referred to such a case in which three pieces of steel were found in an enucleated eye with a single point of entrance.

Dr. Holt (Portland) overcomes the difficulty of the scraping off of the foreign body between the lips of the wound by employing a Stevens hook to effect removal. Dr. Johnson remarked that with his strong magnet, which is not introduced into the eye, the lips cannot wipe off the foreign body; in fact, such a magnet seizes the foreign body so strongly as to be a possible source of danger. It is therefore advisable to approach the eye with the weaker end of the magnet first. It is best to enlarge the wound of entrance if the foreign body does not present readily. He believes it preferable to remove the foreign body through the wound of entrance to making another wound elsewhere in the eye-ball.

Dr. Harlan (Philadelphia) emphasised the importance of removing the foreign body as soon as possible after the injury, before exudation has taken place. He had a case recently in which the X-rays showed the presence of a foreign body, but the magnet had no effect because of the exudation. It is also important to determine the exact location of the foreign body, whether in the lens or vitreous, whether imbedded in choroid or retina.

A Cyst of the Vitreous, with Patient.—Dr. J. O. Tansley (New York) showed a patient, a boy aged 17, who presents a floating body situated about the centre of the vitreous, slightly heavier than the latter, which is fluid. It has no attachment to the coats of the eyeball; is an irregular sphere with indentations, pigment spots and lines upon its capsule. The spheroid is itself transparent or nearly so, being only visible from the spots and lines upon the capsule.

Dr. Alt (St. Louis) thought the cyst might have originated in a tumour of the ciliary body becoming detached. He had himself described adenoma of that structure.

Dr. Randall (Philadelphia) remarked that cysts spring from a coloboma of the choroid and are fairly well known. Perhaps this may be an instance of such a body having become detached.

A Case of Sympathetic Ophthalmia due to Glioma Retinæ in the Fellow Eye.—Dr. A. Alt (St. Louis). The left eye had been removed for tumour by another surgeon; the orbit presented nothing abnormal. The right eye when first seen by the re-

porter showed moderate ciliary congestion, exudation into the cornea, photophobia and a few synechiæ which did not yield to atropin. No fundus reflex, tension good, light perception. Diagnosis, sympathetic ophthalmia.

Treatment.—Mercury and iodides. Improvement. Five months later fingers could be counted at eight feet. At this time the left orbit showed several small tumours. The tumour of the globe and these orbital tumours proved, upon examination, to be gliomata. The point of interest in this case was the occurrence of sympathetic ophthalmia from tumour in the exciting eye and the improvement in the inflammation under treatment.

Cases of Metastatic Panophthalmitis.—Dr. Millikin (Cleveland). The first case occurred in a woman, aged 35, suffering from typhoid fever. Irido-choroiditis developed in the seventh or eighth week, probably from extension of meningeal inflammation. The patient died.

The second case was probably one of endocarditis. There was gouty arterio-sclerosis with enlargement of the spleen. Typhoid was diagnosed. On the fourth day the eye showed signs of panophthalmitis, the patient dying upon the sixth day.

The third case was one of pneumonia in a male, aged 37. Upon the fourth day of the disease the right eye became affected, the day after the left; blindness supervened upon the seventh day, the patient dying shortly after.

Dr. Fryer (Kansas City) thought that some special pyæmic conditions must have existed in these cases.

Dr. Sutphen (Newark) observed an instance of binocular disease during an attack of pneumonia. The patient is still living.

Dr. Randall (Philadelphia) had seen a case terminating in atrophy of one eyeball in extra-uterine pregnancy with mummified fœtus.

Dr. Randolph (Baltimore) had a similar case during an attack of grip. The bacteriological examination generally shows that the pus in these cases is sterile.

Dr. Alt (St. Louis) inquired whether cerebro-spinal meningitis was epidemic at the time of the occurrence of these cases. He has had such cases in grip.

A Case of Spontaneous Rupture of the Eyeball.—Dr. Millikin (Cleveland). The patient was a woman with absolute glaucoma of both eyes. During an attack of severe pain one eyeball ruptured with considerable hæmorrhage, the linear opening extending from the centre of the cornea upward into the margin

of the sclera. The cause was probably suddenly increased tension from hæmorrhage into the vitreous.

Multiple Rupture of Sphincter of Iris with Subsequent Development of Myopic Astigmatism.—Dr. W. F. Mittendorf (New York). The patient was struck in the eye with a stone, rendering him unconscious. The eye became much swollen and he was unable to see for a time. When first seen the anterior chamber contained blood; the pupil was irregular from six distinct indentations (ruptures); there was no unusual dilatation. The iris yielded to atropin, but without losing its irregular outline. There was no other lesion. Vision equalled $\frac{20}{200}$. The blood became absorbed and the media became clear. One month later vision equalled $\frac{20}{20}$; with -3.0 D.C. = $\frac{20}{30}$, the axis of the cylinder corresponding to the long axis of the irregular pupil. The iris reacts to light; hence, the sphincter cannot be entirely lacerated. Inasmuch as the ophthalmometer shows the cornea to be normal the astigmatism must be lenticular. It is possible that a slight tilting of the lens is responsible for the development of the astigmatism. No dislocation of the lens could be demonstrated.

Dr. Harlan (Philadelphia) remarked that rupture of the sphincter of the pupil is more common than is usually supposed. It is often mistaken for paralytic dilatation. He had reported such cases. The accommodation is unaffected or slightly diminished.

Normal Pupillary Reaction with Microscope for its Measurement.—Dr. Lucien Howe (Buffalo). Changes in the size of the pupil may be due to (1) Variation in the light; hence a photometer is necessary for very exact measurements; (2) Accommodation; (3) Respiration and circulation; (4) Psychic causes. He called attention to the inadequate means at our disposal for registering or estimating exactly the diameter of the pupil, and presented a microscope for this purpose which magnifies from 20 to 30 diameters (see p. 7).

Is there a "Hypermetropia Acquisita."—Dr. B. Alexander Randall (Philadelphia). Dr. Randall contended that the claims as to decrease of myopia or acquisition of hypermetropia, which had been advanced by Donders and Landolt, were based really on what was daily exemplified in younger subjects where accommodative strain not infrequently resists even the prolonged employment of a competent mydriatic. Evidence is lacking that any change in the lens is not rather in the direction of greater disparity in the refractive index of its layers, although the frequently

notable increase of refraction in late life is due to cataractous changes ; and the tradition of a flatter cornea lacks confirmation. He had shown that there is little change in the average H. usually found in the eye in infancy, maturity and advanced life, and urged that all burden of proof rested on those claiming for individuals, or in general, any natural and actual decrease in the static refraction.

Dr. Holt (Portland) has used high per cent solutions of atropin, making measurements of the refraction, and some years later has found marked changes.

The Value of Acoin as a Local Anæsthetic in Eye Surgery.—Dr. R. L. Randolph (Baltimore). After using a solution of 1-300 he has been able to extract foreign bodies without pain. Where the eye is congested several instillations are necessary, and even then acoin is less effective than cocain or holocain. The sting is greater with the solutions of acoin than with cocain. Acoin, which is a white powder and generally soluble in the strengths employed, requires as long a time to produce anæsthesia as cocaine and less than holocain.

Conclusions.—In solutions of from 1-100 and 1-300 acoin produces satisfactory anæsthesia in uncongested eye ; where there is irritation it is not satisfactory. It has no effect upon pupil, accommodation, or tension, nor upon the epithelium of the cornea. Bacteriological experiments show it to be also an antiseptic.

Dr. Howe (Buffalo) remarked that it is possible to obtain a numerical expression of anæsthesia by variations in the blood tension, as shown by the manometer.

Some Uniform Tests for Vision, Colour-Sense and Hearing.—Charles H. Williams (Boston) presented sets of lines and test objects for railroad employés, images of semaphores and coloured lights obtained by inserting coloured glass before the light of a lantern, as well as the Holmgren colours.

A Modified Perimeter.—Dr. Charles H. Williams (Boston) presented a modification of the perimeter, in which the fixation point and the test object were small electric lamps. The latter are made to travel along the arc by a reversible electric motor. Coloured glasses can be brought before the lamps. The intensity of the light can be made to vary by interposing resistances of different strength.

LACRIMAL OBSTRUCTION IN THE YOUNG.

BY DONALD GUNN, F.R.C.S.

OPHTHALMIC SURGEON TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET, AND ASSISTANT-SURGEON TO THE ROYAL WESTMINSTER OPHTHALMIC HOSPITAL.

I DO not know of any statistics dealing with the age at which lacrimal troubles are most frequent, but if such were worked out I think the figures would show a marked relative frequency among adults past middle life and young children. That, at least, has been my experience, and if the practice of other ophthalmic surgeons confirms it, the cases I have brought together under the above heading will have some value in their bearing on the juvenile group. I shall make no attempt to divide my cases according to the presence of one or other form of lacrimal trouble ; it will be sufficient for my purpose to assume that any patient with an obstruction to the passage of tears below the lacrimal sac has, potentially, any of the consequent links of that chain of events which leads up to lacrimal abscess and its later results. I will therefore group them all broadly as cases of lacrimal obstruction.

It is evident that to discuss the subject fully I should begin with the question, "Why do adults of 45 or thereabouts (especially women) suffer from lacrimal obstruction?" I have no intention of attempting to answer this, but will content myself with an expression of the belief, apart from any special knowledge of nasal disorders, that, in the majority of cases, there is no

obvious cause. Assuming this to be true, I would add, in contrast, the belief that among children it is rare for lacrimal obstruction to arise without an obvious cause.

Among my records of a good many cases of lacrimal obstruction occurring in children, I can find only two or three in which the trouble seems to have arisen, as I have suggested it does in adults, without obvious cause; and I have little doubt that if these two or three cases could have been kept under observation for a longer period, their number would have been still further reduced by the appearance of other evidence of some general disease, such as syphilis or tubercle, of which the lacrimal disorder had only been a local manifestation. This assumption is founded on experience gained in watching some of the subjoined cases.

The occurrence of dacryocystitis and lacrimal abscess in the newly-born has been generally recognised, and is, I fancy, mentioned in most of our text-books on ophthalmology.

Now, lacrimal abscess is only the last stage of the cumulative effects of lacrimal obstruction, and is preceded by a longer or shorter period, during which the sac is losing tone and accumulating and elaborating its contents; a process that must necessarily occupy some time.

When, therefore, a newly-born infant suffers from an abscess of this kind, it is evident that the dilatation of the sac must have developed during intra-uterine life; the acuter suppuration only following upon the exposure of the child to the outside world and the admission of pyogenic organisms to the collected material. The history often confirms this; the "lump" is noticed soon or immediately after birth, but does not inflame till a week or two later.

The condition, therefore, in so far as it is con-

genital, is one of mucocele, and not of dacryocystitis or abscess. This I believe to be the rule.

So far, we have been considering only those conditions caused by distension or inflammation of the lacrimal sac. In some of my congenital cases, however (and it is to these that I wish to draw special attention), it became evident on operating that something more than the lacrimal sac had to be reckoned with.

This was proved (1) by the amount of muco-pus present, which was largely in excess of what the normal lacrimal passage¹ in an infant could contain, and (2) by the fact that exploration with a probe after the canaliculus had been opened showed the fluid to be collected in a cavity having a diameter many times larger than that of the nasal duct, and formed, not by the destruction of the tissues normally bounding the duct, but by their displacement.

In three cases (Nos. 1, 2, 4) the greatest diameter of the cavity appeared to be its antero-posterior, as though the collection of fluid had pushed aside the yielding structures and made its way backwards towards the posterior nares.

Modern authorities on embryology state that the duct is formed, not merely by the meeting and welding together of the margins of the fronto-nasal and maxillary processes, but that it is laid down as a solid epithelial column derived from the ectoderm, this column becoming subsequently hollowed out to form both the sac and duct, and finally, to open into the conjunctival sac above and the nasal fossa below.

The most obvious explanation, then, of the presence of this cavity in some cases of congenital obstruction, is that it represents a dilated duct, the dilatation being brought about during foetal life by an obstruction at the lower end. Such an obstruction might very well

¹ By lacrimal passage, I mean the sac and duct taken as one.

be due to some developmental fault, resulting in a failure of the duct to complete itself by opening into the inferior meatus of the nose.

This explanation, assuming its correctness, suggests the following queries :—

(1) What is the histological nature of the tissues obstructing the lower end of the duct ?

(2) Is there any secretion and passage of tears during foetal life ?

(3) If not, what is the material that collects and causes distension of the lacrimal passages ?

(1) The mucous lining of the nose—derived from the surface epiblast—is the last structure to be perforated by the growth of the lumen of the duct, and must of necessity form one, if not the sole, constituent of any obstruction left by the failure of this process to complete itself. In the adult we know that the lower extremity of the duct is formed by the mucous membrane, which at this point often makes a more or less complete valve across the opening. It is, therefore, probable that in most cases the fault is due to a persistence of the continuity of the mucous membrane at this point. The rapid cure following the passage of a probe in some of the cases quoted (Nos. 2, 5, 6) points to the obstruction having been thin and membranous.

At the same time, we must not lose sight of the possibility of the cartilages being at fault, for at birth the cartilages representing the lacrimal, superior maxillary, and inferior turbinate bones bound the duct more or less completely, being thickest towards the lower end of the duct where it is crossed by the turbinate.

Lastly, in the nose of a foetus there are cartilages present which disappear entirely later on, and are not permanently represented by any bone in the adult skull. One such is a layer that connects the cartilaginous ethmoid above with the lateral cartilage of the nose below.

Any abnormal growth or persistence of the cartilages might, therefore, block the duct. In cases Nos. 3 and 7 there was evidence of this condition being present.

(2) The fact that the margins of the eyelids are cemented together till shortly before birth does not do away with the possibility of tears passing from the conjunctival sac into the lacrimal passage, for, the puncta being inclined backwards, they are free to work even when the lids are closed—as in sleep. As, however, the eyes are completely protected from external stimuli, the secretion of tears, if it takes place at all, is probably very slight.

(3) During late foetal life all mucous surfaces secrete a certain amount of fluid and shed their epithelial waste. The meconium contains bile, but consists mainly of waste matters derived from the lining membrane of the gut and its accessory glands. The cavity of the vagina at birth is filled with a solid mass of epithelial cells. The lacrimal sac and duct, as they are lined by epithelium and possess mucous and acinous glands, are doubtless able to secrete the material for their own distension—given, that is, an obstruction low down in the duct.

On looking through the notes of my cases of lacrimal disease in children, most of which have come under my care at the Hospital for Sick Children, Great Ormond Street, I find that they fall most readily into two main groups, an early and a late.

1st. The early group to include those cases in which the trouble was present at birth or soon after birth.

2nd. The late group of those cases in which the child for the first few years of its life has been free from any suspicion of lacrimal obstruction, but develops a lacrimal abscess later on. These, being obviously not congenital cases, contrast most fairly with the adult class.

I will further subdivide my two main groups thus :—

The Early Group into :—(a) Cases in which there is evidence of the obstruction having been present at or before birth, the fluid in some cases being contained in a cavity which probably represents a dilated nasal duct.

(β) Cases in which the symptoms have arisen somewhat later, generally in association with conjunctivitis, but which, even if truly congenital in origin, show no evidence of a dilated duct.

And the Late Group into :—(a) Cases occurring in syphilitic children and often associated with interstitial keratitis.

(β) Cases in which the obstruction was caused by tubercular disease of the bones of the nose or orbit.

I do not, of course, put this classification forward as anything more than a convenient arrangement to be observed in relating my own cases.

CASES OF LACRIMAL OBSTRUCTION DATING FROM BIRTH, IN SOME OF WHICH THERE WAS CERTAIN EVIDENCE OF THE PRESENCE OF A DILATED DUCT, PROBABLY DUE TO A CONGENITAL OBSTRUCTION AT THE LOWER END OF THE DUCT.

Case 1.—Lacrimal abscess in a newly-born infant, due to a dilated nasal duct. Operation. Cure.

— L., aged 13 days. (W. O. H. 5.) The right eye was noticed to be “weak” on the ninth, and swollen on the next day. Came with a subacute pointing lacrimal abscess. The canaliculus was opened, and a good deal of pus let out—more than one drachm. “A probe passed into the sac enters what feels like a large smooth-walled cavity, extending backwards along the outer wall of the nose.” The amount of discharge rapidly lessened, and the patient ceased attending after one or two visits.

Case 2.—Lacrimal abscess, distended nasal duct. Operation. Cure.

Lily B., aged 1 month. (W. O. H. 67.) “A healthy-

looking baby, with a good family history. Discharge from both eyes began on second day; the right improved, the left continued to discharge. There is slight redness of the skin over the left sac, and, on pressure being made, creamy pus regurgitates through the upper *punctum*." Under chloroform the lower canaliculus was slit. "The probe passes into a cavity, narrow laterally but of some extent antero-posteriorly—certainly not an ordinary duct. The probe passes down, probably on to roof of mouth, but cannot be felt in the nostril. The amount of pus let out—about two drachms—must be largely in excess of what the sac in an infant of this age could contain. There is no roughness or constriction to be felt." At the next visit the redness and swelling had entirely disappeared, and there was no regurgitation from the sac or sign of pus about the eye.

Case 3.—Congenital mucocoele, due to incomplete formation and subsequent distension of the nasal duct. Lacrimal abscess. Operation. Cure.

Arthur W., aged 6 months. (H. S. C. 62). A healthy child. The left eye had been watery since birth. A lacrimal abscess formed at fifth week, and was opened (through the skin) by the doctor. The mother, an intelligent woman, had never noticed any nasal trouble or difference in the moisture of the two nostrils.

The child was brought with the abscess reforming. I opened the canaliculus, and passed a probe into what appeared to be a dilated duct. The wall of the cavity felt normal; at any rate, there was no bare bone to be felt, but the probe could not be passed into the nose, the point being stopped by coming flat up against a solid obstruction covered with mucous membrane, not being gripped by any constriction. I put a lead wire style into the duct, but, owing to the size of the latter, the style could not be kept in, and the discharge continued. A few weeks later I passed a stout probe down the duct, and pushed it through the obstruction, which felt like cartilage. A long lead wire was then passed, the upper end being bent over at the inner canthus, and the lower

end brought out at the nostril, and bent up over the *ala nasi*. This was kept in for ten days. Six weeks later the child died of pneumonia, but during that time there had been no discharge from the sac, and the mother said the eye was cured.

Case 4. — Large abscess in neighbourhood of lacrimal sac present at birth.

D. R., aged 9 days. (Mr. Nettleship's Moorfields case, 1892.) The child was born with swollen and discoloured lids on one side. The labour was normal and quick. No snuffles. Examined for condylomata; none present. There was a large brawny fluctuating swelling which was increasing. On opening this through the skin much foetid pus escaped. No bone felt. The antrum appeared normal. Two weeks later a silk drain put in.

Six weeks later opening enlarged and cavity examined. The lining appeared to be mucous membrane. It was scraped out and plugged. At this time it was noted that a probe passed into cavity could be felt through the soft palate by a finger introduced into mouth. The canaliculus was also opened; the probe passed from it into the cavity.

After this scraping the discharge lessened, and a month later the wound had healed, the only discharge being a little from "the corner of the eye."

Patient then disappeared for two months. When seen again the cavity was noted to be "still suppurating." It was again scraped.

The notes cease at this point.

Case 5.—Congenital mucocele. Later, lacrimal abscess. Dilated duct. Operation. Cure.

George C., aged 6 months. (H. S. C. 66.) The swelling was noticed within a week of birth; it was not inflamed. The doctor in attendance emptied it into the conjunctival sac by pressure. It slowly refilled, and in three weeks was again expressed. It then inflamed and burst through the skin. "A fat, healthy-looking child, slightly rickety. Is the younger of two; none lost. Mother has noticed he 'snorted very badly.' There is a fistulous opening

over sac. Thin muco-pus regurgitates through upper punctum on pressure." A week later lower canaliculus was opened.

"Probe passes into a much dilated duct, the lining of which is quite smooth, and goes on without any sense of obstruction into nose, where it meets another probe passed in at nostril. The two probes do not seem actually to touch, as though there were a layer of mucous membrane between them. The nostril is certainly narrower than the other."

A style of lead wire put in, but owing to size of cavity it could not be kept in place for any time. I had tried to bring the lower end of it out at the nostril, but failed to find it.

Since the operation, two months ago, there has been no swelling of sac and no discharge at any time.

Case 6.—One-sided mucocoele, probably congenital, remaining unaltered for over two years, then promptly cured by passage of probe once.

Ernest H., aged 4 months. (H. S. C.) Came with mucocoele of one eye. The "lump" was first noticed about a week after birth. There had been no conjunctivitis, and the other sac was not affected.

Ordered drops of chloride of zinc, the mother to squeeze the sac empty before using the drops.

Attended for a few months without any improvement. Disappeared for two years, then returned in much the same state, except that the contents of the sac were more definitely purulent.

The canaliculus was opened and a probe passed. I was doubtful at the time whether the probe entered the nose or not, but the practical result was that from that time there was no further trouble, and the sac did not refill.

Case 7. — Conjunctivitis. Lacrimal obstruction apparently caused by cartilaginous plate closing lower end of duct, but without distension of latter. Operation. Cure.

Roderick S., aged 5 years. (W. O. H. 88.) Healthy-looking boy. Has had a gland excised from neck. No family history of phthisis or syphilis. Was born with a

slight discharge from both eyes, but they were never red. Under treatment the left eye recovered completely, but the right continued watery. When 2 years old the lower canaliculus was opened and a probe passed. The only effect of this was to make the discharge (which had been thick) thinner. Since then it has altered very little, except to lessen during the summer months. He has been unusually free from "colds in the head," and there have never been any signs of nasal obstruction.

Operation.—"The sac contains muco-pus, and is easily emptied on pressure. The canaliculus is open. A No. 4 probe passes easily into a duct of normal size, the lining of which is quite smooth. At the lower end of the duct it is arrested by a solid obstruction, and the lower end cannot be felt in the nose. On applying pressure the probe passes through the obstruction, giving the sensation that it has perforated a plate of cartilage. The lower end can now be felt in the inferior meatus resting on the floor of the nose."

Two months later the mother writes: "There has been no discharge, not even a tear in the eye, since the day of the operation."

A word as to the treatment of these cases. It is not till the canaliculus has been laid open and a probe passed that the diagnosis of dilated duct can be made with certainty. When the obstruction is formed of mucous membrane, the passage of a probe down the duct into the nose at once establishes an opening, and the case gives no further trouble. But when the lower end is occluded by cartilage and a way has been forced through it, the temporary use of some form of style, to keep the lower opening patent, is advisable. In any case, it is necessary to make sure that the end of the probe has passed on to the floor of the nose; this can best be done by exploring the lower meatus with another probe passed in at the nostril. The metallic "click" when the two probes meet removes all doubt.

A style, to be of use, must differ from the usual form. The cavity is often so large that a stiff short style, instead of being supported by the wall of the duct, lies at almost any angle, and tends to drop out repeatedly, or even to disappear into the cavity. The restlessness of infants makes it next to impossible to keep their hands away from the eye. The safest way, I find, is to pass a stout lead wire down the duct, and on finding its lower end in the nose, to bring it out at the nostril and turn it up over the *ala nasi*. The upper end is then bent downwards at the inner canthus in the usual way. It is then quite secure, and the child may be allowed the free use of its hands.

CASES OF LACRIMAL OBSTRUCTION IN INFANTS, IN WHICH THE EVIDENCE OF A CONGENITAL ORIGIN IS NOT GOOD. NONE OF THEM OPERATED UPON, AND, THEREFORE, NO PROOF OF DILATATION OF THE DUCT; BUT SOME OF THEM ASSOCIATED WITH, AND POSSIBLY CAUSED BY, AN ATTACK OF CONJUNCTIVITIS.

Case 8.—Dacryocystitis of one eye, with history of previous conjunctivitis of both.

William H., aged 8 months. (H. S. C. 6.) Soon after birth there was some discharge from both eyes; a lotion was used, and the left eye improved, but the discharge from the right continued. A healthy-looking child. Came with a purulent collection in the right sac, the left being normal. He was seen at intervals for fourteen months, no change having taken place, except that the discharge became clear, or nearly so. Drops of chloride of zinc were used during that period. No operation was done. He was lost sight of.

Case 9.—Muco-purulent ophthalmia of one eye. Mucocoele.

Winifred P., aged 6 months. Came with muco-purulent ophthalmia of right only. This had been present since birth. I examined for a mucocoele, and made a note

that none was present ; but a few weeks later my *locum tenens* noted : "Distinct regurgitation from right sac." After attending for five months and using astringent lotions, the patient stopped attending.

Case 10.—Conjunctivitis from birth. Four months later, dacryocystitis of one eye.

Reginald L., aged 2 months. (H. S. C.) At first visit I noted : "Muco-purulent conjunctivitis present since second day after birth. Never severe. Discharge is watery." This probably referred to both eyes. Drops of chloride of zinc were prescribed. A month later : "Probably no mucocele." A month later : "Regurgitation of thick muco-pus from left sac." Attended for six months, was then lost sight of. No operation was done.

Case 10A.—Dacryocystitis of one eye (? following conjunctivitis).

Eric T., aged 5 years. (H. S. C.) Healthy-looking boy. Nothing in family or personal history pointing to syphilis. Has had a glandular abscess in the neck. Comes with mucocele of right ; contents semi-purulent. Said to have begun as a "cold" in that eye. Treated with drops of chloride of zinc for some months, under which discharge altered to clear mucus. No operation.

The few examples forming this somewhat fragmentary group were cases of mucocele or dacryocystitis, not of acute abscess. As there was no urgency about them, the earlier ones were treated and watched, the treatment consisting in the use of drops of chloride of zinc (gr. 1— $\frac{3}{4}$), the mother being instructed to empty the sac and dry the eye before applying the drops. In this way a few of them were possibly cured, others remained unaltered for a long time ; most of them probably lost heart, and drifted elsewhere for treatment. Nowadays, I do not watch cases for long if I suspect a congenital cause.

It is just worth noticing that, though in several of the cases the trouble seemed to date from an attack of conjunctivitis, the latter was never anything worse

than the catarrhal form; it was not *ophthalmia neonatorum*.

Of course, there is the possibility that the conjunctivitis was in reality secondary to a congenital mucocele and that I overlooked the latter in spite of having searched for it (see Case 9). With a very young patient this is an easy mistake to make, for on attempting to make pressure on the sac the infant screws up its eye, the puncta are lost sight of, and a slight regurgitation of mucus may be missed.

CASES OF DACRYOCYSTITIS OR LACRIMAL ABSCESS IN SYPHILITIC CHILDREN; MOSTLY IN ASSOCIATION WITH INTERSTITIAL KERATITIS.

Case 11.—Syphilitic boy with lacrimal abscesses.

Fred. K., aged $4\frac{1}{2}$ years. (H. S. C. 51.) Undoubted syphilitic. Left eye has always been "watery." Comes with suppuration about sac, recent. Eighteen months later abscess in right sac. Many operations at intervals, during three years and a half. Much erosion of bone. Nose became depressed. His mother also had ozæna and a misshapen nose.

Case 12.—Interstitial keratitis in youth. Fourteen years later, lacrimal obstruction, &c.

Mrs. B., aged 31 years. (W. O. H. 51.) Undoubted syphilitic. Interstitial keratitis at 16. Operation for lacrimal obstruction two years ago. Has atrophied irides and pupils inactive to light. Is absolutely deaf.

Case 13.—Lacrimal obstruction in syphilitic boy. Later, double interstitial keratitis.

Wilfrid S., aged 8 years. (W. O. H. 50.) Undoubted syphilitic. Operation for lacrimal obstruction when 6. Comes with severe double interstitial keratitis. Right eye is divergent and defective from choroidal disease.

Case 14.—Interstitial keratitis. Later, lacrimal obstruction.

Ethel T., aged 19 years. (W. O. H. 69.) Undoubted syphilitic. Had interstitial keratitis when 10 years old.

Sight never good since then. Had operation on tear passage three years ago.

Case 15.—Interstitial keratitis. Mucocoele.

Miss B., aged 22 years. (P. 168.) Typical heredito-syphilitic. Interstitial keratitis at 10 years of age. Comes with a tense mucocoele of left. Has lost bone from nose, which is much depressed. Operation, &c. Bones much altered and eroded.

Case 16.—Abscess about lacrimal sac, leaving indolent skin ulcer and local necrosis of bone, with dacryocystitis. Later, interstitial keratitis, with rapid cure of the ulcer under anti-syphilitics.

Elsie D., aged 9 years. (G. O. S. 58.) Came with a history of watering of left eye for three months past, with an attack of "erysipelas" soon after watering began. This was doubtless a lacrimal abscess, for it left an ulcerated swelling over sac, and for this she was brought to hospital. The ulcer was over or just in front of the lower part of sac, had a dusky infiltrated edge, and led by a sinus through the nasal process of the superior maxilla into the nasal cavity. The sac was distended with muco-pus. I scraped the ulcer freely with a sharp spoon, plugged the opening into the nose, opened the canaliculus, and passed a lead wire down the duct.

The family history was unimportant. There had been no miscarriages, and all the children were healthy with the exception of one boy, who had had fits, and was said to be "weak in the spine," and had been an out-patient at Queen Square.

The patient herself appeared to be free from any evidence of hereditary syphilis. I made a provisional diagnosis of "tubercular bone disease with skin ulceration and secondary lacrimal obstruction." She was taken into hospital and treated on these lines, but the ulcer showed no inclination to heal, and the edge of it became more dusky and heaped up.

Six weeks later she developed interstitial keratitis in that eye. She was put on pot. iod., and black wash used to the ulcer. In four weeks it was soundly healed and the scar quite flat. The lacrimal sac gave no trouble after passage of style.

I found out later that she had been treated at the Orthopædic Hospital for periostitis of the tibia, which remained thickened. Later, right interstitial keratitis.

I believe that inherited syphilis is the commonest cause of lacrimal troubles in children, though in any particular case the proof that a lacrimal abscess is of syphilitic origin must usually wait upon the appearance of other and more certain evidence of the general disease. In the cases I have given briefly the occurrence of interstitial keratitis, before or after the lacrimal trouble, has made the diagnosis safe. Taken as a class, the striking feature of such cases is the extensive erosion of bone about the sac and duct; treatment is consequently most unsatisfactory.

Primarily a disease of the muco-periosteum or bones of the nose, the duct is next affected, causing lacrimal obstruction and mucocele. When the sac inflames there is further loss of bone from spread of the inflammation to the lacrimal bone or the nasal process of the superior maxilla. More rarely these bones are the seat of the disease from the beginning, the duct and its walls remaining sound.

LACRIMAL OBSTRUCTION IN ASSOCIATION WITH, AND CAUSED BY, TUBERCULAR AFFECTIONS OF THE BONES OF THE NOSE OR ORBIT.

Case 17.—Swelling about inner part of floor of orbit, with secondary dacryocystitis, first on one side then on the other. Later, acute pulmonary tuberculosis.

Jessie P., aged 9 years. (H. S. C. 48.) Family all healthy. No miscarriages. No deaths. Patient, who has had "ulcers" of both eyes, comes for the nebulæ. Has a strumous lip, and is flat-faced, with a wide bridge to nose, but not suggestive of hereditary syphilis to my eye. Teeth good. Knee-jerks present.

A few weeks later "comes with swelling in and about left lacrimal sac. The sac is tense, but the swelling

extends outwards along floor of orbit and is very hard, feeling almost like bone."

The sac was opened and muco-pus let out, and a probe passed down duct, which felt quite normal. Emptying the sac did not affect main part of swelling, which persisted as a hard solid projection into orbit from floor or margin. Many enlarged glands below jaw on that side. Taken in and put on cod-liver oil and iodide of iron. The swelling slowly subsided till nothing was left but some ill-defined thickening about inner wall of orbit.

Six months later came with an exactly similar condition on right side. Noticed for a week. "The swelling extends outwards to slightly beyond centre of lower margin of orbit, and rises directly upwards for about 6 mm. No regurgitation from this lacrimal sac."

The second swelling varied in size for two months, then flared up and became fluctuating. It was opened, and some pus let out. No bare bone could be felt. The solid part remained after the pus was evacuated, then *slowly* decreased, leaving more or less thickening. Iodide and mercury were given, but without effecting any improvement.

Six months after the appearance of the second swelling she came to the hospital on one of her periodic visits, and I noticed that she looked ill. On taking her temperature I found it to be 104° .

She was admitted under Dr. Lees and remained in the hospital for some weeks. Her illness proved to be acute pulmonary tuberculosis, and she lost ground very rapidly, the temperature rising to about 104° every night. Dr. Lees thought there was possibly suppuration of some of the intrathoracic glands. She was finally removed by an inebriated father, and probably died shortly afterwards.

Case 18.—Lacrimal abscess, without obvious cause. Later, tubercular disease of nose and ulceration of conjunctiva of opposite eye.

John B., aged 10 years. (H. S. C. loose paper.) Came with lacrimal abscess on right side, of three months' standing, and lacrimal fistula. The canaliculus was opened and duct probed; it seemed healthy. The abscess cavity was scraped, but there was no evident connection

between it and the sac. Has had discharge of "blood and matter" from nose on to pillow at night. The nostrils are crusted with dried bloody serum, septum is crooked, and mucous membrane of turbinates is much hypertrophied. The cavity was scraped once or twice, and ultimately healed after a style had been kept in duct for some weeks.

Fourteen months later came complaining of left eye. The margin of upper lid is notched, and on everting it there is a well-marked tuberculous ulcer, the whole palpebral conjunctiva being florid and succulent.

Mr. Kellock says he has no doubt there is tubercular ulceration of the nose. No family history of phthisis. Is still attending.

Recently this patient has attended at the Golden Square Throat Hospital. Mr. Lack, under whose care he is, reports that "there is extensive lupus of nose, which has led to perforation of septum and is producing obstruction of passages by large masses of granulation tissue. There is much scarring of fauces from same cause." This patient was shown at the July meeting of the Ophthalmological Society.

In writing this paper the cases forming the basis of it were the only material at my disposal, the opportunity of examining *post mortem* a case of congenital lacrimal obstruction having never arisen. Approaching the subject, as I did, from one side only, the deductions I drew were too speculative to carry much weight, though the cases as a group seemed to me to be worth recording.

Since then a paper has appeared in the *Archives d'Ophthalmologie*, February, 1899, by Dr. Rochon-Duvigneaud, entitled, "Dilatation des voies lacrymales chez le fœtus et le nouveau-né consécutive à l'imperforation de leur orifice inférieur. Conditions anatomiques qui favorisent la dacryocystite congénitale." In this the writer gives the results of the exami-

nation of bodies of thirty infants (mostly stillborn), and proves on anatomical grounds the occasional existence of a congenital obstruction at the lower end of the nasal duct—an obstruction which I had only assumed to exist on evidence that was purely clinical. My paper stands in its original form.

REVIEWS.

V. MORAX and M. ELMASSIAN. The Role of Toxins in the Production of Inflammations of the Conjunctiva. *Annales d'Oculistique*, August, 1899.

Most of the specific infections of the human conjunctiva are peculiar to man, and it is impossible, whatever the method of inoculation, to obtain a proliferation of the microbe on the animal mucous membrane. For this reason a positive result is never obtained by the usual methods of inoculation. The authors have, however, succeeded in producing conjunctivitis in the rabbit by a method of continuous instillations of cultures from various micro-organisms (gonococcus, bacillus of Weeks, &c.) Every two or three minutes a drop is carefully introduced into the conjunctival sac, the instillations requiring to be continued, almost always, for at least three or four hours.

The gonococcus, bacillus of Weeks, the diplobacillus, and the staphylococcus are the micro-organisms that were more especially studied. A live culture of gonococcus introduced into the conjunctival sac of a rabbit caused no particular reaction when only a few drops were applied, and shortly after the last instillation the gonococcus could no longer be found, but a drop applied continuously every one or two minutes caused acute conjunctival injection and œdema of the bulbar conjunctiva in from one and a-half to two hours; there was also abundant fibrino-purulent secretion which continued for four or five hours after

the last instillation. This reaction, caused by the introduction of live cultures, is not due to a proliferation of the microbe; the same culture subjected to a temperature of 58° C. for twenty minutes (this temperature kills the gonococcus without modifying the medium and its toxin) causes a reaction not appreciably differing from that caused by the live culture. A reaction a little less intense is produced by a culture freed from microbes by filtration on a Chamberland filter. The phlogogenic substance produced by the gonococcus may therefore be diffused in the liquid of the culture. Immunity was not caused in rabbits even after applications of the culture had been made at intervals of a week for several months. The reaction preserved the same characters every time.

Experiments made on the human conjunctiva with a filtered culture showed that it is a little more susceptible to the action of the phlogogenic substance than the animal conjunctiva, for it required a much larger quantity of filtered culture to produce in the rabbit a reaction nearly equivalent to that of the human conjunctiva. The reaction, conjunctival injection and secretion, began in man after an incubation of two or three hours and reached its height in six to eight hours. The phlogogenic action of the gonococcus on the mucous membranes is connected with the production of a soluble product contained in the bodies of the microbes, but diffusing itself also in the liquid of culture. This substance penetrates slowly through the intact epithelium of the mucous membrane and is destroyed by a temperature of 115° C.

The toxin of the diplobacillus of subacute conjunctivitis, even when injected in large doses, does not cause any reaction in animals; when a living or filtered culture is instilled continuously into the conjunctival sac of a rabbit, conjunctival injection, œdema, and secretion occur after two hours, but these disappear shortly after cessation of the instillation. The reaction produced by the toxin of the bacillus then is similar to that of the gonococcus, it only differs by the secretion being a little less marked.

The bacillus of Weeks develops a substance with

phlogogenic properties whose effect is seen in about three hours after the beginning of the instillations. This substance is chiefly in the bodies of the microbes, but to some extent in the liquid of the culture; a more feeble reaction results from the filtered than from the live culture. This substance is completely destroyed by a temperature of 110° C.

Filtered cultures of staphylococcus cause a local reaction which does not differ from that produced by the gonococcus, and their period of latency is practically the same. The reaction is considerably diminished by heating the liquid to 115° C. for fifteen minutes.

On comparing the action of abrine and the venom of serpents on the conjunctiva with that of the microbic toxins, it was found that they differed from these in that the instillation of one or two drops was sufficient to cause conjunctival reaction. For abrine the incubation period is long, twenty-one or twenty-two hours; venom causes a local reaction in seven or eight minutes. The results obtained from the experiments with the microbes prove that the ocular mucous membrane of the rabbit is susceptible to the toxins of these microbes, and that it reacts in much the same way as the human conjunctiva. Since these toxins only slowly penetrate the mucous membrane, a prolonged contact of the toxic liquid is necessary to cause the characteristic reaction; from the beginning of the instillations to the appearance of the reactional symptoms there is an interval of two or three hours.

C. H. U.

TRANTAS (Constantinople). The Treatment of Night-Blindness by the Ingestion of Liver. *Recueil d'Ophthalmologie*, July, 1899.

The liver of animals, ingested as a therapeutic agent in cases of night-blindness, has all the advantages which long standing recognition can give it, for it appears that Hippocrates, who seems to have known everything, recommended as the best treatment for this condition the

eating of large quantities of raw ox-liver mixed with honey. It has, however, fallen into disrepute, and Galezowski and others who have investigated its claims to a place in one's pharmacopœia, have tried and found it wanting. The authors who mention it with approval are very few, still Trantas considered it wise to employ it in the case about to be mentioned.

N. G., a peasant, aged 25, had complained of night-blindness for about eight months; he had no family history of such a condition; he himself had long had malarial fever, and two years previously had suffered from an extremely severe attack of jaundice which had lasted all summer, and during that time he had become much emaciated. The night-blindness had come on quite suddenly about two months after the onset of the jaundice, and lasted two months, and had only disappeared after a series of "liver fumigations" suggested by some old woman. Trantas defends himself against the charge of being taught wisdom by this Sybil, by mentioning that he was not informed of this circumstance until after he had recommended a similar line of treatment. The patient had never completely recovered, and eight months before presenting himself before Trantas a recrudescence of his night-blindness had occurred, and along with this, at least for the last three months, distinct failure of vision even during the day. At the first examination the patient was found to be much jaundiced, with some rise of temperature and with enormously enlarged spleen and liver, neither of which was tender on pressure, however; he had had diarrhœa for months, and suffered frequently from hæmorrhages from the gums. As regards the ocular condition, the right eye could count fingers at 3 metres, or on a very bright day at 5 metres, but when evening was approaching, or even half an hour before sunset, he was unable to guide himself; he could not see the stars at all; tested in a "dark" room with feeble lamp light he counted fingers only at eight inches; to enable him to do this at 1 m. the light required to be very bright. With the left eye he was able to count fingers at $1\frac{1}{2}$ m. in daylight, but

at night could not distinguish whether a candle was lighted in the room or not. In both eyes the field of vision was reduced to about half its proper dimensions in every direction, and perception of colours was very imperfect. There was a considerable degree of sclerosis "en plaques" of the conjunctiva, chiefly on those parts always exposed to the air. The cornea of the right eye was somewhat intransparent and "ground-glass like," this appearance being due to the presence of a great number of fine dots in the superficial layers of the cornea; the condition of the left eye was similar, but distinctly worse, the substance of the cornea being semi-opaque and vascularised. The lenses carried some iritic deposits, and ophthalmoscopic examination of the left eye was impossible, but the right disc was very pale and atrophic; pulsation of the vessels on it was very marked, but whether these were arteries or veins could not be decided; there were attacks of spasmodic closure of the lids. Other treatment having totally failed to produce any benefit—indeed the patient was going from bad to worse—Trantas decided to administer liver, which he did to the amount of 200 grammes per diem, besides twice a day "fumigating." From the very commencement of the new treatment improvement began, vision showed amelioration by the following day, and the corneal opacity became less dense. Even so soon as a week after the commencement of the liver treatment the field of vision was enlarged, central vision had risen to $\frac{1}{4}$, the sensibility of the cornea, which had been dulled, was returning, the pulsation of the fundal vessels was no longer to be made out, the xerosis of the conjunctiva was gone, and at the same time the patient's general condition was much improved as was shown by his better hand grip, and his diarrhœa had ceased. In fact, after the liver treatment had been kept up for something a little over three weeks, the patient left hospital cured of his night-blindness and his kerato-malacia; there was an improvement even in the colour of his optic discs.

His success with this patient encouraged Trantas to carry out the same line of treatment in other cases

presenting similar symptoms. In one patient who was suffering from cancer of the liver and who, along with indifferent vision and night-blindness, had narrow vessels and pale discs, ingestion of liver had also a beneficial influence. Another patient was a youth of 20, the subject of night-blindness for the last three years; his father was also night-blind, this condition being most probably due, in Trantas' opinion, to insufficient and bad feeding, for the patient was living in a state of dire poverty; both father and son were greatly improved by free ingestion of liver. Yet another was a man of 65, decidedly alcoholic and suffering from hepatic congestion; his night-blindness vanished under treatment on the same lines.

Among the children in an orphan asylum Trantas had already observed one epidemic of night-blindness, and when this broke out again, accompanied by a contagious follicular conjunctivitis, he decided to feed the patients freely on liver; in the cases of this series both vision and fields were intact; these cases also were cured by liver treatment only, without the employment of any other remedy. What interested Trantas greatly was the rapid disappearance of the xerosis, which passed off in some ten or twelve days, for in the former epidemic, during which opotherapy had not been employed, it had persisted for months. In a number of these patients it was very manifest that one had to do with a systemic malady, and in one who died of tuberculosis shortly afterwards, *post-mortem* examination showed a hypertrophied liver, with amyloid degeneration. To sum up, Trantas believes this old world method to have fallen into a disuetude quite undeserved, and from which it should be rescued.¹

W. G. S.

¹ In this review we have avoided the use of the word hemeralopia, believing as we do that it is unwise to employ either that term or its opposite, nyctalopia, since there is so much confusion as to their correct meaning, for to designate the same condition one author would write the first of these terms, and another the second. Under the circumstances it is better to discard both, and say "night-blindness" and "day-blindness."—ED.

R. DEUTSCHMANN (Hamburg). Treatment of Detachment of the Retina. *Beiträge zur Augenheilkunde*, xl., 1899.

In 1895, Deutschmann published the result of his operative treatment of 16 cases of detachment of the retina. He has since continued his operations, and after four years has completed the treatment of 101 cases in all, the consideration of which forms the subject of the above monograph. Relatively to the total number of patients which Deutschmann had occasion to see during the same period, 85 cases of detachment of retina operated on in four years, in addition to 27 which either refused operation or were unsuitable for it, form, as Deutschmann points out, a not inconsiderable proportion of cases of this nature. The number is remarkable as showing that Deutschmann's treatment has, at all events, aroused the interest of the public and of the general medical practitioner.

A full account is given in the monograph of all the cases treated, some of which have now been under observation for five years and more. A proper estimate of the value of Deutschmann's treatment, so far as such can be gathered at all from a written account alone, can only be arrived at by a careful study of the individual cases. There is so much that has to be taken into account. There is, for instance, the previous condition of the eye in which detachment has occurred. There is the immediate cause of the detachment, which of course can as a general rule only be conjectured. Other points again are the degree of visual defect produced by, and the duration of, the detachment, the age of the patient, the length of time the case has been under observation after the treatment, &c.

Deutschmann has modified somewhat his method of operating. He now makes what is tantamount to a transfixion of the eye far back with a sharp two-edged knife. The knife is entered at, say the outer and lower part of the sclera, as near the conjunctival fold as possible.

It is then carried rapidly across to the corresponding point of the eye on the inner side. A counter puncture is made here involving all the coats with the exception of the conjunctiva. The blade is then withdrawn, its point on withdrawal being made to make a slight curve towards the centre of the eye. In this way Deutschmann believes the retina is twice penetrated, whilst at the same time two openings are provided for the escape of the pre-retinal and sub-retinal liquid. He no longer slashes his knife about in the vitreous with the object of cutting through real or imaginary bands.

The second operative proceeding, viz., the injection of rabbits' vitreous into the space in front of the retina, is done with an instrument which is a combination of knife and canula. The vitreous best adapted for the purpose he finds to be that of a young rabbit, which vitreous has been stirred up along with neutral salt solution under aseptic precautions, and allowed to settle. Deutschmann believes that this vitreous injection is an important addition to his method of treatment. It must be remembered, however, that the injection is reserved for cases which are not benefited sufficiently by the double puncture operation (*Durchschneidung*). Further, apart from the actual injection, the surgical interference is very similar to the *Durchschneidung*, and in many if not most cases anything like a permanent improvement seems only to follow repeated punctures. It does not, therefore, appear evident that the injection is entitled to be regarded as a specially valuable adjunct to the treatment.

Of 101 cases treated by operation Deutschmann claimed to have "cured" 26, and to have more or less greatly improved 34. Of the remaining 41 he considers that 7 were at first greatly improved but afterwards relapsed, while 34 either showed no improvement after treatment, being from the first more or less evidently unsuitable, or did not, for some reason or other, remain sufficiently long under treatment, or had not at the time of publication been long enough under observation to admit of the definite result being known.

It must be admitted that the above does not on the whole (judging of course only from the records of the cases as published) appear to be an unduly sanguine estimate of his results. Probably, as regards some of the cases taken as cured, an impartial critic might be disposed to differ; notably cases 4, 6 and 9. On the other hand, amongst those referred to as relieved there are some in which improvement continued sufficiently long to permit of their being looked upon as cured. The cures may, therefore, fairly enough be put at 25 per cent., if we may depend upon conscientious examinations having been made throughout. That this percentage is a great deal higher than that obtained spontaneously or by rest or simple puncture alone is evident to anyone who has had a large experience of the treatment of retinal detachment. A closer examination of the records of all Deutschmann's cases shows, as might have been expected, that the best results were obtained amongst the detachments of traumatic origin, and those occurring in younger individuals whose eyes had previously not shown evidence of very extensive disease. A spontaneous cure, aided by rest it may be, is not by any means such a rare occurrence. Yet if all cases of detachment are taken, for a sufficiently large series, such cures could hardly at most amount to more than from 5 per cent. to 10 per cent. Deutschmann's attempts to minimise the proportion of spontaneous cures, or cures effected by other means than those adopted by him, are too crude to be taken seriously. They, unfortunately, rather tend to make one sceptical as to the *bona fides* of his own records.

When one considers the occasional permanent improvement got by scleral puncture within the area of detachment, and the almost constant temporary improvement which such treatment, when combined with rest, brings about, it is not difficult to understand that a more frequent puncturing, whether done by Deutschmann's or some other method, and an altogether more prolonged treatment, might well be expected to increase the proportion of more permanent cures. A reference to Deutschmann's

cures will show how almost invariably he has resorted to repeated *Durchschneidungen*, sometimes as many as 11 being performed at intervals in the same case. There has, therefore, no doubt each time been brought about a reposition of the retina of some kind, with the consequent chance of an organic adhesion taking place at some time or other from hæmorrhage or other exudation.

Many cases of detachment such as those occurring in highly myopic eyes of old people, will no doubt always prove to be incurable. But of other cases, as to which one knows that spontaneous cure is not so rare, the study of Deutschmann's recorded results would certainly tend to make one more sanguine of the possibility of greater proportionate good resulting from repeated suitably performed punctures of the eye. At the same time one would surely hesitate in view of his results to combine vitreous injections with puncture. The advantage claimed for these injections is not supported by the clinical evidence which Deutschmann adduces.

The author's remarks as to the nature of retinal detachment and the explanation of the effect of his treatment are of minor importance. They are besides too fanciful to attract much attention. In this connection the reader must however be referred to the original.

The impression which a study of Deutschmann's earlier and later investigations and clinical studies in connection with detachment of the retina has made on the writer of this notice, may be summed up in conclusion as follows: Deutschmann has been led by theoretical consideration, the correctness of which is more than improbable, to a treatment which at first was necessarily (if not dangerously) complicated, and is probably still so, but which in his hands has evidently been followed by no small degree of success. Should others who may be induced to adopt this treatment, in so far at all events as repeated punctures are concerned, find that the eye tolerates these well, and that they give anything like the same proportion of good results as those claimed by Deutschmann, his method of *repeated surgical interference* when divested of any superfluities

which further experience will no doubt point out, must eventually come to be regarded as an important advance in ocular surgery.

GEORGE A. BERRY.

PANSIER (Avignon). Adherent Conjunctival Flap.

Annales d'Oculistique, October, 1899.

There is no question that the existence of a conjunctival flap attached to the anterior lip of the extraction wound is of great value in the operation for cataract, though in the minds of some its disadvantages, in particular the liability to troublesome hæmorrhage which makes thorough clearing of the pupil from cortical masses difficult or impossible, outweigh its admitted benefits. In order to insure rapidity of healing, which, after all is said and done, is in reality the greatest of all protections against infection of the wound, various plans have been suggested. Among these are the application of a suture to the wound, and the extraordinary expedient proposed by Rohmer who draws the conjunctiva over the whole cornea in the form of a "purse"; the method now brought forward by Pansier is intended to unite the advantages attained in a less simple manner by these two.

His plan is as follows:—He proceeds somewhat upon the lines which guide some surgeons in the performance of sclerotomy; he makes an incision after the manner of Fuchs in the corneo-scleral junction, but on coming near the summit, so that there are only left some 5 or 6 mm. of intact cornea in front of knife, he ceases to cut forwards, and turning the edge of the knife backwards, so that the blade lies upon the sclerotic, cuts under the conjunctiva for some distance; he then withdraws the knife *without cutting across* the bridge of conjunctiva thus mapped out. This incision, then, leaves an undivided bridge of conjunctiva adherent at one extremity to the conjunctiva of the upper portion of the globe, and at the

other to the summit of the corneal flap. The length of this conjunctival bridge may reach in a favourable case to as much as 6 or 7 mm., and in such a case he prefers to reduce somewhat the size of the corneal section, which on the contrary he enlarges, and even brings right into the corneal substance, when he has to do with a deep sunk globe. The rest of the operation proceeds on the ordinary lines.

The chief disadvantages which are entailed by the procedure thus briefly described are some difficulty in the exit of the nucleus, and still more in the removal of cortex, and the fact that troublesome hæmorrhage is almost sure to occur. The lens must of course be made to escape round a corner, so to speak; after passing through the corneal aperture it has to turn either to right or to left and slip out from under the conjunctival bridge. As the principal advantages of this plan Pansier claims immediate and perfect apposition of the lips of the wound, and consequently rapid healing. He does not claim, what strikes us as distinctly a possible good point, that in cases in which the conjunctival sac is in a septic condition from inefficiency of the drainage by the tear passages, or in which operation would be attended with special danger on account of the feeble vitality of the patient and his cornea, this plan insuring, as its author says it does, perfect coaptation and, as it must do, perfect nourishment of the corneal flap, healing will be more rapid and more certain than after operation by the more ordinary methods. In this relation the reviewer has always considered that one of the chief points in regard to success or failure in a case in which, from one or other of these causes, the operation is attended with more than the average amount of risk, is the saving of time in healing; if the wound can heal, if the cornea, feebly nourished though it be, has sufficient vitality to adhere to the opposite lip before the septic influences obtain sufficient power, success is assured. Whether this suggestion of Pansier presents any advantage over the simple conjunctival flap which heals with such extra-

ordinary rapidity, he cannot say. The evident inconveniences seem to him to outweigh the distinct gain, but in suitable cases the plan is worth a trial, and, as the author himself points out, if one finds the bridge to be in any case too great an obstacle to the nucleus and to the removal of the cortex, there is nothing more simple than to divide it with scissors and then proceed as usual.

W. G. S.

J. HINSHELWOOD (Glasgow). Letter-, Word- and Mind-Blindness. *London: H. K. Lewis, 1900.*

The writer has brought together in his book (of 83 pages) several papers, dealing with this subject, which he has previously published in *The Lancet*; these include an account of a number of exceedingly interesting cases. In a lucid manner the author endeavours to show that all the varieties of letter-, word- and mind-blindness can be intelligibly explained by regarding them as disorders of the visual memory, produced by lesions affecting a definite area of the cerebral cortex, in which are preserved the past visual impressions arranged in definite groups. A table of references is appended.

FATIGUE FROM THE EFFORT TO MAINTAIN BINOCULAR SINGLE VISION.¹

BY GEORGE J. BULL, M.D., PARIS.

It is a fact that no longer admits of doubt that fatigue of the eyes, and consequent disturbance of the nervous system, are often caused by the difficulty of maintaining binocular single vision. The patient, however, seldom recognises that he has a difficulty in using the eyes together until with the help of his physician he learns to observe carefully and to analyse his symptoms. The physician, on the other hand, finding that the correction of refractive errors relieves his patients, often fails to appreciate the fact that the difficulty has been one of maintaining binocular single vision, and that the glasses have given relief chiefly by making it easy for the eyes to work together.

The first cause of the difficulty is often a difference in the form and size of the images perceived by the two eyes, the consequence it may be of ulcers which have deformed the cornea, or of other forms of refractive error. When this difference is great and insuperable, the patient is apt to allow one of the eyes to deviate. He then enters the class of strabismus cases, ignores, it may be, the image received by the deviating eye, and having renounced all effort to see binocularly ceases to feel fatigue. In other cases binocular single vision is habitually maintained at the expense of a fatiguing

¹ A paper read at the International Ophthalmological Congress at Utrecht, August, 1899.

effort, and not with the ease characteristic of eyes which are normal.

A difference in the refractive error of the two eyes often leads to a difficulty of accommodation, for the focussing effort most suitable for one of the eyes will not be precisely that required for the other. As a consequence of this we frequently find, as might be expected, that when the refractive error is different in the two eyes, there is also some anomaly of the ocular muscles. It is in these cases that the phorometer, the Maddox rods and other tests made while the patient looks at two images of a distant object without the aid of his natural impulse to single vision, show that one eye tends to take a position higher than its fellow or to deviate to one side.

It is true that a tendency to deviation, or heterophoria, may exist in eyes which are not subject to fatigue, but the tests for heterophoria are nevertheless of great value, especially when we have other evidence of muscular inefficiency.

In my opinion it is not enough to consider carefully the nature of the patient's symptoms and the degree of heterophoria; it is even more important to determine his power of binocular fixation, and the facility with which, under varying circumstances, he can maintain it. For this purpose I know of no instrument so useful as the stereoscope. In a paper read before the French Society of Ophthalmology in 1898,¹ and also in a paper read at the meeting of the British Medical Association in 1899,² I described a ready method of measuring the amplitude of convergence with the Holmes stereoscope and with a stereoscope of my own design, and I pointed out the fact that with

¹ "Le Stéréoscope comme moyen de diagnostic dans les troubles de motilité oculaire."—*Bull. Soc. Franc. d'Ophthal.*, 1898.

² THE OPHTHALMIC REVIEW, September, 1899.

these instruments we may not only determine the tendency to deviation, but demonstrate that there sometimes exists an incoördination of the ocular muscles.

On the present occasion I do not propose to discuss the importance of the various tests by which we determine the degree and kind of muscular inefficiency, but rather to consider what statements on the part of the patient may be useful in the diagnosis of the real nature of the difficulty.

It may be remarked at the outset that patients are not apt to make clear statements of their case without the help of a physician familiar with the subject, who encourages them by careful questioning.

For the sake of clearness I will speak of the case of one of my patients, a woman of over thirty years of age, who had been troubled all her life with pain about the eyes and distressing headache. The patient had binocular single vision habitually. She was not conscious that she had ever seen double, but on various occasions mentioned certain phenomena which indicated that there had been irritating diplopia, although she did not recognise it. For instance, she told me that for years the altar lights in Catholic churches had annoyed her very much: they confused her, they seemed to be unsteady, to waver and to change position laterally. It was not until after she had made experiments in my consulting room in seeing candle lights single and double that she recognised that her confused sensations while looking at the altar lights were simply the result of diplopia and of the effort to correct it.

If she looked for any length of time steadily at the face of a person, or at any object, she had what she called "a cross-eyed feeling," or confusion, which later examination showed to be the consequence of crossed diplopia. Sudden changes of light were exceedingly disagreeable to the patient because the change of

illumination increases the difficulty of fusing images. The sudden inrush of daylight when the curtains are opened in the morning is as provoking in this respect as going from the light into a darkened room.

The imperfection of binocular single vision was shown also in the occasional loss of the perception of the third dimension. At the head of a staircase all the steps seemed to extend in the same plane as the landing, and the patient had the habit of never descending a staircase without first feeling for the top step with her foot or with her parasol. She would never look closely at any object, or allow a person to come very near her, but would draw back, for she felt that her eyes "would become crossed" (that is, would deviate outwards) if she looked at anything too near her.

This brings me naturally to speak of such occupations as reading, writing and sewing. The patient could hardly thread a needle, for whenever she winked she lost sight of the eye of the needle and passed the thread to one side of it. She had to give up sewing altogether, because she had, as she expressed it, "to set the eyes to make them come into place and see the stitch." The effort this called for caused general uneasiness and great irritability.

There is no doubt that in such cases nature makes systematic efforts to maintain binocular single vision, and that many devices are resorted to of which the patient may be quite unconscious. For instance, while reading or writing my patient felt every few minutes as if the eyes crossed and then went back instantly to the proper position. She would lose a word and find it by looking at another part of the page, and then back to the place where the word ought to be. This is undoubtedly an example of the recovery of binocular fixation by the device of stimulating the fixation muscles by momentarily changing the direction of the eyes. The change was made so

rapidly that if she were reading aloud no one would observe an interruption in the reading. As another example I may mention that when the patient was speaking to anyone she never looked steadily at their eyes, but glanced very quickly from one eye to the other, then to the forehead, then to the mouth, and finally would glance downwards and up again at the eyes. She was sometimes dimly conscious that it would give her still greater relief to rest the eyes on a distant object.

In looking from an object before her to another far to the right or left, she was careful to turn her head slowly, fixing one or more objects as they passed the median line, until the desired object was reached. If she failed to take these precautions, it was difficult to see the object when she came to it, and she had to resort to a further artifice to remove the confusion. This way of turning the head and not the eyes was a habit from childhood, and there can be no doubt that the difficulty of seeing and the confusion she spoke of had to do with diplopia ; for subsequent experiments showed that troublesome diplopia was apt to occur when she looked far to the right or left. These examples are sufficient to show that great efforts were made to maintain binocular single vision, and efforts made so continuously must necessarily be the cause of serious fatigue to the patient. For years she was scarcely ever free from a slight pain over one of the eyes and at the back of the head. In order to understand better the patient's difficulty it may be well to consider her own words : "No matter how deeply interested I am," she says, "at the end of half-an-hour's reading, and frequently sooner, I am disturbed by increased pain in the eyes and at the back of the head. I usually ignore this, however, and continue reading. But in a few minutes, oppressed by a slight sense of suffocation, I raise my head quickly, feeling I must take

a deep inspiration because there is smoke in the room, and on looking around there seems really to be smoke all about me. Distant objects are dim, and I cannot distinguish the hands of the clock directly in front of me. If I go on reading after this these symptoms increase and are accompanied by slight nausea. If, however, I stop reading about this time, the symptoms quickly disappear, but if I continue, on the contrary, for a length of time, a violent headache will be the consequence, and the pain will extend down the back on both sides of the spine."

When the pain at the back of the neck was troublesome, examination showed that the muscles passing from the shoulders and spine to the occiput were rigid and swollen, and showed tenderness upon pressure. The same was found to be the case in other painful parts when the size and position of the muscles permitted their examination. When the pain was not too severe gentle massage relieved it; more violent movements tended, on the contrary, to increase it. The electric current also often relieved the lesser pain in a few minutes.

Taking all her statements together I am inclined to infer that the ocular distress was accompanied by manifold symptoms of the nature of tension or spasm. She noted, for example, that she frequently held her teeth clenched and drew her toes up in her shoes when the eyes were troubling her most. The sense of slight suffocation, oppression and general distress could be attributed to rigidity of the muscles of the chest, for it was best relieved by massage of that region.

The patient said that after reading for some minutes, or upon trying to see in a relatively dim light, she felt as if somebody had clutched her by the throat, which seems to indicate a muscular spasm in that region. The sensation led the patient to stretch the neck in various ways and to yawn, but when the ocular irritation was removed it passed off quickly.

All the organs of the body being in a healthy state, there could be no doubt that the irritation which brought on and increased the general muscular spasm was propagated from a central source of irritation in or around the eyes, and the question naturally suggests itself whether the ocular pain was not also produced by spasm.

Another phenomenon noticed in this case may help to elucidate the subject. The patient often observed in the theatre when the lights were lowered, that she suffered from pain in the eye and at the back of the head, that she was oppressed by a slight sense of suffocation, and that objects were seen as if through smoke. The same thing happened on entering a darkened room or church, but the most interesting fact observed at these moments of oppression, while the pain lasted and the vision was dim, is that her glasses, which under ordinary circumstances improved her distant vision, now seemed to obscure it, and she saw much better when she took them off. This would make it almost certain that at these times there was spasm of the accommodation, for no other condition that I know of could momentarily increase the refraction and render the convex glasses *de trop*. This opinion is further strengthened by the fact that other patients complain sometimes of not being able to see with their glasses in the evening, or when the light is dim, and that the glasses thus complained of are convex glasses used to correct manifest hypermetropia. I suspect that cramp of the muscles of accommodation sufficient to give a sense of tension and pain in and around the eye may occur without making a very noticeable change in the refraction. The physician is careful to conduct his examination of refractive errors in such a way as to avoid everything that may provoke spasm or hypertension of the ciliary muscles ; but in spite of his precautions he often gets the complaint of

a sense of tension and evidence of other disturbances, which to my mind may be best explained by the assumption that ciliary spasm has not been altogether avoided.

It may be remarked with regard to the disturbing effect of a darkened room, that the insufficient illumination adds to the difficulty of fixation, causes frowning and increase of tension in the external ocular muscles, and the stimulus thus sent through the third nerve may set up spasm of accommodation. Disturbance of the muscle of accommodation is often associated with disturbance of the muscles of fixation. We have an example of this in the confusion and diplopia which not infrequently occur when we call upon the two eyes to work together after an examination which has fatigued the accommodation of the eyes examined separately.

To return to my patient :—Tests with the Maddox rods while she looked at a candle placed five metres distant showed crossed diplopia, the eyes diverging about 3° and the left eye becoming the lower of the two. The cover-test also showed insufficiency of the interni. Upon the principle already indicated, I then proceeded to use the stereoscope for the purpose of determining the degree of ease or difficulty with which the patient could use the eyes together.

My test cards have each two circular discs, one for the right eye and one for the left, and a scale enables me immediately to determine the degree of convergence when the discs are properly fused at any distance.¹ By these tests I learned that the patient had a singular difficulty in keeping the discs fused, and that she was unable to fuse them except under low degrees of convergence. The terms ordinarily applied to such

¹ See my paper on "Le Stéréoscope," *Bull. de la Soc. Fr. d'Ophthalm.*, 1898, and THE OPHTHALMIC REVIEW, 1899.

cases, namely, insufficiency of the interni, exophoria, or exotropia, latent divergent squint, &c., seem to express inadequately the patient's condition, for the stereoscope showed it was difficult for the eyes to work together in any position. There appeared to be, in fact, a veritable incoördination of the ocular muscles. Moreover, when test cards were used with discs more widely separated, requiring a slight degree of divergence in the eyes in order that the discs should be fused, fusion was again maintained but for an instant, and the eyes would converge too much and then go off in a spasm of divergence. It was noticeable also that when the eyes diverged most the left eye became lower than the right.

It would appear, therefore, most probable that there was hypertension of the ocular muscles, and it was shown beyond the possibility of doubt that when the externi were called upon to make an effort they went into a state of spasm.

The stereoscopic exercises affected her in exactly the same way as reading, but more quickly and more disagreeably. She frequently felt as if the left eye were doing all the work. If she persisted in trying to fuse the discs of the stereoscopic cards her spirits became depressed and she looked haggard and miserable. The use of glasses which corrected the difference in the refractive error of the two eyes, the use at other times of stronger convex glasses to relieve the strain of accommodation, and the use of prisms to correct hyperphoria, seemed to have no effect in making stereoscopic exercises easier. The difficulty of fusing the cards was the same with or without glasses; and it appeared also that when cards were used which called for no effort of fusion, but only one of observation as to the relative position of the images perceived by the two eyes, the confusing and exhausting effect was equally great. When, however,

I placed the two small black discs, not on a plain white card, but upon two photographs representing the stereoscopic view of a distant landscape, the two dots having the same interspace as that between the chief objects in the two photographs, it was remarked that it was easier to maintain binocular fixation on such a stereoscopic card, while letting the eyes wander from one part of the picture to another, than it was to keep up fixation on the small black discs on a white ground. The patient told me she had never, even in her early childhood, been able to look with comfort at stereoscopic views.

To sum up, the stereoscopic tests showed that it was the effort to fix and to maintain fixation which gave trouble, and that efforts to fix with optic axes parallel or slightly divergent were quite as perplexing as those made when the eyes were converging. The tests showed also that imperfections in the instruments used, quite imperceptible to the casual observer, added notably to the difficulty of keeping the eyes together.

This leads me naturally to consider the nature of the relief afforded this patient by the glasses which fully corrected her refractive error, namely, a myopic astigmatism in the right eye, and a hyperopic astigmatism in the left. Without these glasses the images perceived by the two eyes were of different size and shape; with them the images were approximately equal and therefore more easily fused. With the glasses the eyes required equal efforts of accommodation and therefore acted more in harmony one with the other.

The glasses were a great comfort to the patient, and seemed, as she stated it, to make things steady and keep them from slipping. They made distant lights much less perplexing, and lessened the difficulty of looking from omnibuses and railway carriages, and in general in looking at passing objects. On

several occasions after doing exercises which called for strong action of the external recti muscles, the patient suffered for twenty or thirty minutes from crossed diplopia. It was remarkable on these occasions how the double images were instantly fused when the patient put on her glasses. The diplopia would return when she took them off and again disappear when she put them on. By bringing about harmony in the accommodation of the two eyes, the glasses seemed to act as a stimulus so as to mask the inefficiency of the internal recti. The patient's power of overcoming abducting and adducting prisms while maintaining binocular single vision of a distant candle flame was notably better with the glasses than without them. The patient often complained of a "cross-eyed feeling" when she took off the glasses, and at such times the eyes were apt to deviate outwards if she looked at anything very long. The glasses relieved the constant pain in the back of the head and gave considerable freedom from headache, but the pain returned whenever the eyes were used in stereoscopic exercises, or in reading or writing. It was most remarkable that although the glasses made the patient comparatively comfortable in looking at distant objects, they gave her hardly any relief in using her eyes upon objects near or distant which required her to maintain the act of fixation.

Tonic treatment, the rest cure, douches, massage and electricity had all failed to enable the patient to use her eyes as other people use theirs. Neither stronger convex glasses nor prismatic glasses lessened the difficulty of reading.

Considering these circumstances, the exophoria, the lower position of the left eye, the spasm of the externi, and the inefficiency of the interni, I was led to make a tenotomy of the external rectus, and a partial advancement of the capsule over the internal rectus of the

left eye. The operation was followed within a few days by remarkable improvement in the symptoms.

One of the first changes that the patient noted was that when she closed her eyes to go to sleep they seemed at perfect rest, whereas for many years before they had felt as if they were constantly crossing and rolling about. It had been her habit from childhood to try to quiet the eyes by pressing the lids with the fingers, and in fact it had never been possible to obtain relief from the ocular spasm by closing the eyes, inasmuch as the efforts of fixation appeared to go on uninterruptedly.

A day or two after the operation no effort was needed to pull the eyes in, or to keep them from diverging. She had no trouble in looking quickly from one object to another in any position whatever. Distant lights appeared now to be steady. Stereoscopic exercises were done with ease and showed a normal amplitude of convergence.

Within a month after the operation the patient could read or sew for several hours at a time without fatigue and there was no blurring of the sight upon looking up afterwards. Travelling in railway carriages and looking at moving lights ceased to cause nervous irritability.

Sudden changes of light, such as those noticed upon entering a darkened room, or when the curtains are first opened in the morning, no longer caused any confusion of the sight.

Sixteen months have passed since the operation, and none of the old difficulties have returned. There has been no sense of tension or pain in and around the eyes or at the back of the head. The muscles all over the body have regained their normal tone, and glasses, which formerly seemed indispensable, have been altogether laid aside.

In my opinion what happened was simply this :—The external recti so overbalanced the internal recti

that a constant and fatiguing effort was required to keep the eyes from turning outwards. This led to momentary incoördination of the ocular muscles and cramp-like contractions, which set up irregular muscular and nervous action in other parts of the body, and brought on a general neurasthenia. The essential part of the operation, a tenotomy of the external rectus muscle which was chiefly at fault, corrected its overbalancing action, thus relieving the strain of the internal recti and the accompanying disturbance of the muscle of accommodation. The source of irritation in the ocular muscles being removed, harmony of the ocular movements was restored, and the symptoms depending upon the propagation of the irritation to other parts of the body were relieved.

The importance of this case, to my mind, lies not only in the fact that it directs attention to the far-reaching consequences of ocular spasm, but also that it indicates the advantage that may be obtained for purposes of diagnosis by the minute analysis of those subjective sensations of the patient which are very often dismissed as being unimportant or misleading.

REVIEWS.

ROGMAN (Ghent). On Pseudo-Accommodation in Aphakia. *Annales d'Oculistique*, October, 1899.

SALZMANN (Vienna). On Vision in Diffusion Circles, with Special Reference to Apparent Accommodation in Aphakia. *Graefe's Archiv f. Ophthalmologie*, xlix., i., 1899.

In the first of these papers we are given notes on the visual acuity and apparent range of six eyes, originally highly myopic but rendered approximately emmetropic by operation. None of them wore spectacles, and there-

fore any apparent range of accommodation that they possessed must have been due to some intra-ocular process of adjustment. Rogman indeed claims that they showed a "pseudo-accommodation" varying from 2 D. to 5 D., but as the type with which they were tested was as large as 1.75 Snellen at distances of 23 centimetres and upwards, the obvious explanation of their range would appear to be simply the large size of the retinal images and not to be in reality what we ordinarily speak of as accommodation. Indeed the influence of the contraction of the pupil in cutting off the circles of diffusion from objects not in focus, seems, as was long ago maintained by Donders, quite sufficient to explain such cases. As the writer of the paper points out, no theory of "pseudo-accommodation" except this has any facts to support it. An alteration in the curvature of the cornea or in the shape of the eye produced by the external muscles, an alteration in the shape of the anterior surface of the vitreous, or a hernia of the vitreous into the anterior chamber,—these theories are as unnecessary as they are fantastic. No one has yet been able to shake Donders's proposition that accommodation in the aphakic eye does not exist. The obvious moral is the importance of maintaining a small and active pupil in any operation upon the lens.

The German author, starting from the point of view that it is all a question of diffusion-circles, attacks the subject from the mathematical side. The practical conclusion at which he arrives is this: Diffusion circles depend upon the size, not of the actual pupil, but of the virtual image of the pupil seen through the cornea, or through the cornea combined with any lens worn in front of the cornea. This is a magnified image, and its size is increased by convex and diminished by concave glasses worn in front of the eye. Since the range of distinct vision depends on the smallness of this "entrance pupil" ("Eintrittspupille") it is improved by concave and diminished by convex glasses, other things being equal, *i.e.*, the effect of glasses on range is the reverse of their effect on the magnification of the image. Further, in cases

of aphakia, the range is greater, the weaker the convex glasses that have to be worn, and therefore in the case of a myope rendered emmetropic by operation, the range should be greater than that of a cataractous patient whose refraction after extraction is corrected by a convex glass. The last part of this paper refers to the question, in the case of an aphakia eye which possesses a certain range of vision for a given type, for what exact distance is it focussed? Here mathematical theory appears to be at variance with clinical observation. It is a point which would probably repay further research.

A. H. THOMPSON.

REYMOND (Turin). Operative Treatment of small Errors in the Curvature of the Cornea. *Klinische Monatsblätter für Augenheilkunde*. Nov. 1889.

It was shown by Helmholtz, a number of years ago now, that increase of intra-ocular tension had a tendency to produce flattening of the cornea (increased length of the radius of curvature), an opinion confirmed by certain observers who have produced alterations of tension for the specific purpose of noting the effect upon the curvature. The conclusions to which these experiments point may be briefly stated as six.

(1) Increase of tension lengthens the radius of corneal curvature, while reduction of tension tends to shorten it.

(2) The radius of highest curvature is relatively more influenced by the increase of tension than a meridian of less curve; the contrary is true of lowered tension.

(3) In this manner the axes of astigmatism may be altered either by increased or by lowered tension.

(4) When the intra-ocular tension is diminished, the pressure of the lids upon the cornea and of the rectus muscles upon the sclerotic has the effect of increasing the acuteness of the curvatures in the corresponding meridians.

(5) It is even the case that the different portions of one meridian may be differently affected; thus the basal or

peripheral parts of the cornea may be altered by an influence which does not act on the central portions.

(6) The increase of pressure and the lengthening of the radius do not proceed equally; one may increase while the other remains stationary or even retrogrades; this appears to depend to some extent on the resisting power of the different parts of the corneo-scleral junction. To judge, however, from the observations of Axenfeld (who examined the same eye with the ophthalmometer before and after death and found no change in the curvature) and of others, diminished tension does not of necessity produce any change.

Several observers have shown that the corneal astigmatism so often present in glaucoma does not always remain the same either in amount or in direction, and after reduction of tension by paracentesis it varies also. It is suggested that the perverse astigmatism so frequently seen as an accompaniment of glaucoma may have been produced in this way.

It is interesting to observe how very seldom either squint or tenotomy for squint can be shown to alter in the least degree the refraction of the meridian primarily or secondarily acted on by the muscle involved, though it must be admitted that minor degrees of astigmatism are certainly more frequent in the squinting eye than in its fellow, and it would be going too far to attribute the astigmatism to the pressure of the (internal) rectus; but let the tension be reduced, even to quite a slight degree, and the alteration of curvature may become considerable. As everyone knows, after cataract extraction a certain amount of astigmatism may be permanent, and often a very high degree is a temporary result. In the first day or two after the operation it has frequently been found as high as 9 D., and has sometimes been seen to amount to 16 and even to 22 D. The change which takes place is twofold, the meridian at right angles to the line of incision becoming flatter, while that which runs parallel to the incision more highly curved; though the degree of change in the latter is less than that in the former.

Various attempts, more or less successful, have been made to reduce the amount of astigmatism in an eye by judiciously placed incisions in the corneo-scleral margin, and even by cautious removal of minute portions of the corneal substance; thus Baiardi, by repeated small incisions at both ends of the meridian he wishes to affect, claims to be able to reduce an astigmatism by as much as 1.5 D. By means of operations on the rabbit he found that the amount of effect was proportional to the size of the incision and its nearness to the centre. Lucciola of Turin has attempted in a number of cases to reduce the amount of astigmatism present after cataract extraction, by means of incisions running very obliquely through the extreme periphery; these appear to have the effect rather of *increasing* the curvature in the affected meridian during the next day—a result, it will be noticed, which is exactly contrary to that of incision through clear cornea. Lans has made a series of very interesting investigations regarding the effects produced by non-perforating wounds of the cornea in rabbits; he observed an increased curvature in the meridian parallel to the wound, and in a certain number of instances a flattening in that at right angles to it. During and after cicatrization the astigmatism diminished considerably, but he believes that by making two “parallel” incisions with a cautery, each involving about two-thirds of the thickness of the cornea, and about 2 mm. from the limbus corneæ, one at either extremity of a given meridian, he can produce a permanent astigmatism of from 4 to 5 D. In a certain number of cases of conical cornea Raymond has been able, by simple incision, to cause complete disappearance of the central opacity, which owes its origin to œdema of the tissue, and at the same time to check the process of ectasia; he has been much pleased also with the results in this disease of making, at the base of the central portion of most acute curvature, a puncture and counter puncture with a Graefe knife, which is then withdrawn without completion of the incision, the process being repeated two or three days later in the opposite direction. This seems to point to the possibility of causing

some flattening down, or lengthening of the radius of curvature by incisions near the centre; but at the close of his paper Reymond admits that the results of all such interference are so uncertain in the case of ordinary astigmatism, and in order that an operation may be even reasonably effective one must attack the cornea so near the centre and thus leave an unsightly scar, that he does not see his way to recommend any operative treatment of a merely optical error.

With this conclusion most practical surgeons will be inclined to agree.

W. G. S.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JANUARY 25, 1900.

Mr. G. ANDERSON CRITCHETT, President, in the Chair.

Pemphigus Conjunctivæ.—Mr. Doyme showed an extreme case of "essential shrinking of the conjunctiva" in an old man. The disease had progressed so far as to produce total blindness in one eye and bare p. l. in the other.

Mr. Juler showed a young married woman with the same disease commencing in one eye and asked for suggestions as to its treatment.

Mr. J. R. Lunn mentioned a case which was before the Pemphigus Committee. It was that of a boy, aged 12, who had recurrent attacks of vesicles on the cornea associated with bullæ all over the body. He had had three attacks, but always got well under treatment.

The President suggested sub-conjunctival injections of chinosol.

Mr. Nettleship recalled the case of a boy with pemphigus of the skin and mucous membranes, including the conjunctivæ, which had got well, but he could not say anything as to the treatment.

Experimental Exophthalmos and Enophthalmos.—Dr. Walter Edmunds read this paper, which was profusely illustrated by lantern slides representing monkeys on whom the experiments had been performed. These demonstrated (1) enophthalmos as the result of (a) partial or complete excision of the thyroid gland; (b) division of the cervical sympathetic, or (c) the administration of cocaine; and (2) exophthalmos as the result of thyroid feeding.

Mr. Lawford, after complimenting the author of the paper, recalled a case of exophthalmos in a woman, aged 34, apparently produced by thyroid feeding. Five years before he saw her she had become the subject of myxœdema, and had been treated with thyroid extract at St. Mary's Hospital. She had improved under this treatment and gone away into the country. Four years later headache and other symptoms came on, which were thought to point to a return of her former complaint. Accordingly, the medical man in her village put her on thyroid feeding again. A week later the eyes were noticed to have become prominent, and when the patient first came under treatment at Moorfields the exophthalmos was well marked, being rather greater on the right side. The patient did not complain of palpitation, and was not emotional. The thyroid gland could just be felt but was not enlarged.

Mr. Mackay referred to a case of enophthalmos on the right side which had followed the operation for removal of the cervical glands, during which the sympathetic must have been injured.

Mr. Juler had seen a case in Paris in which Abadie had removed the upper cervical ganglion of the sympathetic for glaucoma with apparent success.

Mr. Jessop alluded to the bad results which had followed such operations.

Corneal Horn.—Mr. Arnold Lawson read a paper founded on a case of corneal horn, which he claimed to be unique as far as the literature of the subject was concerned. The case occurred in a female hydrocephalic idiot, aged 8, the horn being situated on the middle of the cornea and about half an inch long. The eye being unsightly as well as totally blind, he had excised it, and now displayed sections of the growth. He considered that it was a true cicatricial horn composed of granulation tissue, and he thought the sequence of events was as follows: (1) atrophic changes following pressure on the ophthalmic division of the fifth nerve; (2) ulceration of the cornea leading to perforation; (3) the formation of granulation tissue undergoing unhealthy proliferation, similar to that which produced "proud flesh." He maintained that the tumour consisted not of heaped up corneal epithelium but of granulation tissue, which, in the absence of an epithelial covering, went on proliferating without a check.

Mr. Treacher Collins suggested a different explanation, namely, that after sloughing of the cornea a mass of granulation tissue formed on the surface of the iris, which developed into a pseudo-cornea and became staphylomatous. The unusual thing was the accumulation of epithelium on the surface of this which gave rise to the horn-like appearance.

Acute Glaucoma following a single Application of Homatropine.—Mr. C. H. B. Shears read a paper relating this alarming incident. He had seen a patient with tension of $+3$ in an eye in which, a week previously, a few drops of 1 per cent. homatropine had been instilled, and which had at that time seen $\frac{1}{12}$. He had been able, fortunately, by a timely iridectomy to restore this vision again, but the moral he drew was never to omit instilling eserine after the use of homatropine in a patient over 30.

The President commented on the too frequent use of unnecessarily strong solutions of atropine by members of the profession who were not ophthalmic surgeons.

Mr. Johnson Taylor recalled a case in which homatropine had produced an immediate rise of tension which, he had no doubt, would have gone on to acute glaucoma if he had not at once counteracted it with eserine.

Mr. Brailey thought that the explanation of acute glaucoma after homatropine lay in the presence of glaucoma in a slight or intermittent form. For his own part, he sometimes employed homatropine as a method of diagnosis in cases where a rise of tension, as tested by the fingers, was doubtful.

Card Specimens.—In addition to those already mentioned, the following were shown:—

Detachment of the Choroid.—The case was that of a woman, aged 29, myopic 8 D. in the right eye, in whose left eye the retina was visible in one part with $+4$. In this place "the even striping of the choroidal pigment can be seen quite clearly, islands of normal pigment with the clear lines of choroidal vessels running between them. The visual field for white is very full, and this is probably explained by the sustained nutrition of the retina from the choroid, with which it is in contact." Mr. Holmes Spicer.

Primary Optic Atrophy in a boy, aged $12\frac{1}{2}$, associated with diabetes insipidus. Mr. Holmes Spicer.

Persistent Hyaloid Artery arising from a central coloboma of the choroid. Mr. A. Q. Silcock.

Fibromata in the Lower Eyelids of both eyes. Also a microscopical specimen of *Epithelioma of the Upper Palpebral Conjunctiva*. Mr. L. V. Cargill.

Infantile Cerebral Degeneration associated with Symmetrical White Areas at the Macula. Dr. Still.

FRENCH SOCIETY OF OPHTHALMOLOGY.

OCTOBER, 1899.

Annales d'Oculistique, November, 1899.

Exostosis of both Orbits.—M. Chevallereau showed a patient who had for two years suffered from daily recurring pains in each orbit, along with which there were also exophthalmos and choked and swollen discs, the worst of the appearances being on the right side; the ophthalmoscopic changes had now gone on into atrophy, and the right eye was entirely blind. There was nothing to suggest syphilis, and treatment had been quite unavailing.

M. Antonelli suggested that the symptoms were in favour of a sphenoidal sinusitis.

Retinitis Circinata.—M. de Wecker gave an account of one or two cases in which retinitis circinata had in the first instance been diagnosed in infants as early glioma retinae, and enucleation had been proposed, and indeed in one case carried out by another surgeon.

Strepto-Syphilis.—M. Boucheron. Microbic associations in syphilitic lesions are now recognised to exist, and among these strepto-syphilis is one of the most interesting. In some instances the streptococcal lesion has existed previously to the syphilitic infection, and one then sees a lesion develop which is the compound result of the double general or local infection. This variety of mixed lesion is of particular moment in regard to affections of the eye, &c., and it is necessary under such circumstances to treat both morbid conditions coincidently. He carried this out in a certain patient, thus: A man had been under his care for dacryocystitis, which had resisted other treatment, but yielded to injections of anti-streptococcic serum. Some little time after this he acquired syphilis, followed early by violent and very painful iritis. This was treated with the utmost success without confinement even to the house, by the addition of anti-syphilitic treatment to the anti-streptococcic. He related several other cases, similar in regard to the undoubted presence of both types of dyscrasia, in which the mixed treatment effected results which could not, in his opinion, have been otherwise attained. The serum was given in doses of $\frac{1}{4}$ or $\frac{1}{2}$ ccm. daily, injected under the skin of either abdomen or arm. Redness, swelling, &c., occurred locally, if not immediately then after the third or fourth injection; later, the local reaction was less, and larger doses could be tolerated. He was of opinion that the serum possessed a strong antagonistic power against streptococci and their toxine, but was also of virtue as a tonic and stimulant of the nervous system.

NOVEMBER, 1899.

Corneal Lesions following Affections of V. Nerve.—M. Jocqs related the case of a patient who had suffered from injection and photophobia, first in the right eye and then in the left, followed by violent pains in the head. Jocqs first saw the patient after these symptoms had been going on for some months, when he found minute erosions of the corneæ at the upper part; these lesions came and went; the corneæ retained sensation; the little ulcers began as white points in the substance of the cornea, developing later into erosions with clear base. There was no direct relationship between the ulcers and the pain and photophobia, for these last were sometimes very severe even when the ulcers had for the time being healed up. Peritomy and sclerotomy had done no good, but large doses of iodide seemed to give some relief. There was no evidence of a gouty, or indeed of any other diathesis; ointment of the yellow oxide, suggested by one of the speakers in the discussion, had not given any relief, and Jocqs now proposed to perform Badal's operation.

Extraction with Adherent Conjunctival Flap.—M. Vacher advocated what he called "subconjunctival" extraction of cataract, a mode of operating in which, after the main section is completed, but before the knife is withdrawn, a bridge of conjunctiva is detached, one end resting on the summit of the corneal flap, the other on the sclerotic near the insertion of the superior rectus; the length of this bridge would thus be about 10 mm. When operating in this manner one can modify the length and width of the flap according to circumstances, and even divide the scleral "pier" in order to facilitate the escape of the lens, inserting a stitch subsequently, but the chief point is to have a large raw surface which will heal with great rapidity by the union of the conjunctiva, this union implying inevitably the healing also of at all events a large portion of the corneal wound. By this means the corneal flap cannot become turned over, and hernia of the iris is entirely prevented. He had formerly been accustomed to employ the corneal suture, a plan which gave him excellent results, but which, he confessed, was sometimes difficult of application. The necessity for having the thread kept aseptic, and therefore of protecting it from all the parts with which it might come in contact, the difficulty of inserting the thread before the incision is made and of avoiding cutting it when using the knife—troubles much increased by any unsteadiness on the part of the patient—had caused him to seek a new method less open to objection for closing the lips of the corneal wound, but it was largely by accident that he hit upon the idea of the conjunctival bridge. He adopted it, however, observ-

ing on one or two occasions that it formed a great protection against too hasty an escape of the lens and thus loss of vitreous and incarceration of iris in the wound. It is unnecessary here to describe the operation in detail; it is sufficient to say that he makes a large section, involving $\frac{1}{12}$ of the corneal circle, and after $\frac{2}{3}$ of the section have been completed he turns the edge of the knife not forwards, as some do, but slightly backwards, so as to make sure of emerging under conjunctiva. He does not find that hæmorrhage is so frequent or so large as to be a serious obstacle, but should any occur he considers it sufficient to wait a few moments, for bleeding is only of very brief duration. He performs no iridectomy, and experiences no great difficulty in the removal of cortex; he occasionally washes out the anterior chamber, but not as a routine. To the edges of the lids he applies a little sterilised oil, instils a drop or two of eserine, and applies his collodion dressing; after the sixth day nothing but a shade or dark glasses. The chief advantages gained by the conjunctival bridge are the prevention of prolapse of the iris and the better nourishment of the corneal flap, whereby suppuration is rendered much more unlikely; he has even seen suppuration limited to the portion of cornea at each side of the bridge while the summit was quite sound. He believes, too, that less astigmatism will be present when this method is adopted. M. Vacher proceeded thereafter to discuss the question whether or not the method which Desmarres had employed and rejected was to be regarded as essentially the same as his. Pansier had recently recommended the same mode of operation.

M. de Wecker said he did not think well of the suggested procedure; hæmorrhage was sure to prove very troublesome.

M. Valude stated that the percentage of hernia of the iris was no less when a corneal suture was used than when it was not, and he could see no advantage in complicating the extraction operation in the manner suggested.

M. Suarez de Mendoza spoke in favour of the corneal suture.

Arthritic Affections of the Eye.—M. Galezowski discussed certain cases of arthritic neuritis, periarteritis and thrombosis, in which the ophthalmo-thermometer showed an elevation of temperature amounting even to a whole degree.

M. Koenig attributed certain of the cases of embolism of the central artery to endarteritis.

M. Antonelli placed great faith in injections of pilocarpine in such cases as M. Galezowski described.

Ossified Fibroma of Choroid.—M. Despagnet described a case of this rare condition.

W. G. S.

COLLEGE OF PHYSICIANS OF PHILADELPHIA,
SECTION ON OPHTHALMOLOGY.

Dr. GEORGE C. HARLAN, Chairman.

OCTOBER 17, 1899.

Glaucoma.—Dr. S. D. Risley reported a case in a patient aged 77, coming on three years after a successful simple extraction of cataract. The immediate result after extraction was $V. = \frac{6}{9}$, which fell in six months to $\frac{6}{40}$ in consequence of thickening and opacity of the capsule. After a secondary operation $V.$ rose to $\frac{6}{9}$ and remained at that with a perfectly healthy eye for two and a half years. The patient then suffered a severe attack of influenza, during which the eye was red, probably from a mild iritis. Six weeks later she began to suffer transient attacks of dim vision which became more and more frequent, culminating on the evening of April 23, 1899, in a pronounced attack of inflammatory glaucoma with iris bombé, the projecting iris blocking the angle of the anterior chamber completely throughout the upper and inner two-fifths of the chamber. The cornea was steamy, the ball tender, tension $+2$, and $V.$ reduced to $\frac{1}{8}$. No satisfactory view of the fundus was obtainable. The field of vision was so narrow that the patient had difficulty in finding her way about. She was placed in bed, received a purge and salicylate of sodium, with the free use of eserine and gentle massage locally. This resulted in the rapid subsidence of all the symptoms, so that iridectomy, which had been advised, was deferred. In a few days $V.$ had risen to $\frac{6}{12}$. The tension was normal, the iris bombé had disappeared, the media were transparent, and the field extended to nearly normal dimensions. The eye remained comfortable until the latter part of the following August when the entire group of symptoms recurred. Iridectomy was then performed, resulting in complete relief and the restoration of vision to $\frac{6}{9}$. In discussing the cause of the attack, Dr. Risley stated that he believed it to be due to the annular attachment of the iris to the very dense capsule during the attack of iritis accompanying the influenza in February. The fluids were thus excluded from the anterior chamber and accumulated behind the iris, causing the iris bombé, which still further interfered with the excretion of the intraocular fluids.

Discussion.—Dr. de Schweinitz had seen three cases. In the first case glaucoma appeared in fifteen days after extraction of a complicated cataract. Under treatment with eserine and large doses of chloral, vision recovered to $\frac{2}{30}$ and has been retained

until the present—six years. In the second case glaucoma appeared three years after perfectly successful extraction, and was attributed to prolonged reading on a very hot day. Operation was declined. The first attack was followed by others; some months later the patient had steamy cornea, pulsation of the retinal artery, cupping of the disc, and contraction of the field. Paracentesis was performed without material benefit. In the third case glaucoma appeared three weeks after extraction. Instillations of eserine and freeing of the periphery of the iris from the incarceration in the incision were followed by recovery. In all the cases the extraction was made by the combined method.

Circinate Retinitis.—Dr. G. E. de Schweinitz described a case in which the lesions occurred in the left eye of a woman aged 77, who in other respects was healthy. This disease manifested itself in the form of a large, somewhat wreath-shaped, slightly raised, yellowish-white deposit, which surrounded the macular region and terminated some distance beyond it. In the right eye a similar exudate occupied the macular area, but did not surround it, that is, the lesion was not circinate in character. The clinical evidences were that hæmorrhages had been the antecedent condition.

Discussion.—Dr. Randall said that he had sketched a typical case of the sort which had come under his care. The patient, a feeble woman of 65, presented a large crescentic patch beyond the macula with smaller disseminated areas extending above and below toward the disc in the right eye, the left being unaffected; there was no albuminuria.

Optic Atrophy due to Intestinal Hæmorrhage.—Dr. William M. Sweet exhibited a patient. The blindness occurred six days after profuse hæmorrhage from the bowels, the vision of the left eye being entirely lost, but in the right eye a small area to the temporal side of the fixing point was preserved. Ophthalmoscopic examination made three days after the hæmorrhage showed moderate contraction of the retinal arteries, paleness of the optic discs with slightly hazy margins and slight œdema of the retina, especially toward the foveal region, but no retinal hæmorrhages. From the lower border of the right optic disc a ciliary artery passed toward the fovea, the preservation of some vision in this eye being probably due to the blood supply from this source.

Of the theories advanced to account for cases of post-hæmorrhagic blindness, that of Westhoff and Ziegler, who believe that the ischæmia produces a fatty degeneration of the nerve fibres, would seem to explain the symptoms in many of the cases. Theobald considers that the degeneration follows a thrombosis in each central artery of the retina, the enfeebled blood

current in the retinal artery being further obstructed by the intraocular tension. In this case, however, there was not the marked contraction of the retinal arteries that might be expected to follow a plugging of the main arterial supply of the retina. Ziegler's autopsy of a case, twenty days after the hæmorrhage which led to the loss of vision, showed fatty degeneration of the optic nerves and their intraocular expansions, a condition which Ward Holden has shown, through experimental researches, to follow degenerative changes of the retinal ganglion cells.

Discussion.—Dr. de Schweinitz referred to the work of Ward Holden in investigating pathological changes in this and analogous cases. He believes that the blindness was due to œdema of the retina followed by early changes in the ganglion cells. These changes led to degeneration of the cells and fibres extending upward into the optic nerve as far as the chiasma. The symptoms in Dr. Sweet's case seem to be well explained by this theory.

Physiological Variations in the Size of Mariotte's Blind Spot.—Dr. Howard F. Hansell reported the results of the examination of the size of the blind spot in fifty-two individuals, comprising emmetropes, hyperopes, and myopes. In the distance from the fixation point to the approximate centre of the blind spot as projected 33 cm. there were considerable variations. In emmetropia the longest distance was 9.1 cm. and the shortest 7; in hyperopia the longest was 9.5 cm. and the shortest 7; in myopia the longest was 13.5 and the shortest 6.5 cm. In comparing the distance in the three varieties of refraction, the greatest distance and the shortest distance were found in myopia. The centre of the blind spot was, with few exceptions, below the horizontal line running through the point of fixation. In hyperopia the greatest distance was 25 mm. and the shortest 2 mm.; in myopia, 19 mm. and 5 mm.; in emmetropia, 22 mm. and 2 mm. As a rule, the size of the blind spot was decidedly greater in myopia than in other states of refraction. Very few pairs of eyes showed equal measurements in either the distance of the blind spot from the fixation point or in its position or size, and variations as great as exist in eyes of different individuals were found in the eyes of the same individual. Dr. Hansell concludes that the blind spot has a greater bearing in the measurement of the field of vision than has been accorded to it, and might, in the absence of a knowledge of its size, be mistaken for the scotoma of disease. The discovery that a portion of the field measuring 5×4 cm. of irregular outline, between the 10 and 20° mark on the perimeter, and in some cases including both, is blind, might lead to confusing conclusions as to the real character of the field.

HOWARD F. HANSELL, *Clerk of Section.*

Dr. GEORGE C. HARLAN in the Chair

NOVEMBER 21, 1899.

Chancre of the Lower Eyelid: Dr W. F. Norris exhibited a case.—M. S., aged 45, presented himself on October 20, 1899, and stated that the disease started two days before as a little white blister about $\frac{1}{4}$ inch from the external canthus of his right eye. When first seen there was marked swelling of the lids, with an indurated lump in the margin of the lower lid near the external canthus, about 1 cm. in diameter, yellowish in colour. The bulbar conjunctiva was markedly chemosed, and there was a slight conjunctival secretion. The patient had severe nocturnal pain in the forehead and temple. There were no posterior synechiæ or other evidences of inflammation of the iris. He was ordered a solution of atropia and 10 grs. of potassium iodide, the dose to be increased 2 grs. daily. Four days later the face, lids, and glands of the neck were much indurated and swollen; the yellow lump on the lower lid had broken down, leaving an irregular open sore and ectropion of the lower lid. The severe symptoms gradually subsided, and on the 27th there was no pain, and the swelling of the lids and the chemosis had decreased. The upper margin of the cornea was the seat of several small superficial ulcers. Holocain was applied to the ulcers and the sore on the lid was touched with 5 per cent. solution of protargol, later with mercuric bichloride 1-500. On November 1 there was an indurated sore with a sharp cut excavation. The patient has progressed steadily, and now, November 21, the inflammation has subsided, the ulcer is nearly filled, and there are three minute elevations on the margin of the lid just beyond the outer edge of the ulcer. There is no history of infection to be obtained, no lesion or scar on the penis, and no symptoms of secondary or tertiary syphilis. The patient attributes the lesion to traumatism, and says that some days before the above symptoms appeared the lid was penetrated by a splinter of glass that was removed by a fellow-workman.

Discussion.—Dr. L. A. Duhring stated that there were several interesting points in the diagnosis. First, the period of incubation was extremely short, supposing it to be the primary lesion of syphilis—in fact, there is no case on record where so short a time elapsed from the reception of the wound to the manifestation of the disease; second, a severe inflammatory reaction, such as was seen in this case, is extremely rare. This man complained of pain and the conjunctiva was both chemosed and ecchymosed, both of which signs are not in accord with the

usual course of primary sores. He considered that the word "chancre" was frequently misused. An ulcer, in order to be designated "chancre," should be surrounded with much induration and should be followed by the clinical symptoms of syphilis. In answer to a query of Dr. Wm. Thomson whether this could have been a chancroid, Dr. Duhring replied that he would expect a more destructive ulceration, a more rapid course, and should not look for ecchymosis or œdema. Dr. Thomson related the history of a case of supposed styé which was freely opened, but which later developed into a syphilitic sore. Under specific treatment she recovered, without a subsequent history of eruption or other secondary symptoms. Dr. B. A. Randall mentioned the case of a lady who was infected by a hypodermic needle inserted into the gum. History and culture showed streptococcus. The ulceration involved the palate and was typical of syphilitic ulceration and caries, but was distinctly not syphilis. This case demonstrates that anomalous lesions are not always syphilitic, although they appear to be.

Sarcoma of the Orbit.—Dr. G. Oram Ring presented a patient with a large and rapidly growing tumour, probably originated by a blow. The patient, a boy of 18, had moderate pain and swelling. One week later he was admitted to the hospital with exophthalmos, intense chemosis, marked swelling of the lids and orbital tissues; temperature normal. The chemosis and exophthalmos rapidly increased; the cornea became ulcerated and iris prolapsed. At this time the diagnosis was retro-ocular hæmorrhage. After enucleation, microscopic examination of a portion of the newly formed orbital tissue pointed strongly to a malignant growth, consisting chiefly of large round and polyhedral cells, with some spindle cells. Blood-counts showed the absence of any pronounced degree of leucocytosis, the average count being 9,000. The tumour spread rapidly, invading the frontal bone, the superior maxillary bone, the maxillary sinus, and projected forward several inches beyond the plane of the orbit. The anterior surface was ulcerated and bleeding. The greater portion of the mass developed within the past two weeks. The case was considered inoperable.

Discussion.—Dr. de Schweinitz described four cases of sarcoma of the orbit. The first commenced in the choroid. The eyeball was enucleated in the glaucomatous stage five years after the original discovery; recurrence occurred in five months, when the orbit was exenterated. The second commenced in the orbit and extended to the antrum; the third was metastatic from sarcoma of the abdominal regions; in the fourth the globe was enucleated for choroidal tumour, and later the orbit was cleared of a large

spindle-celled pigmented sarcoma. Dr. Friebeis mentioned a patient who was the subject of disseminated sarcoma, which made its first appearance in the eyeball. Dr. Randall described a sarcoma of the neck which followed direct injury. The tumour appeared in one month; it was removed and recurred, three operations being done. The growth extended from the eye over the side of the face to the ear and down as far as the clavicle. It was then regarded as inoperable, and treatment by injections of the serum of erysipelas was instituted. The patient improved daily and was able to return to work, and in six months showed no sign of local or metastatic growth. He recommended this treatment to be tried in Dr. Ring's case. Dr. Duhring considered that the tumour in this instance sprang from the blow. The rapid growth is not incompatible with the history and appearance in young persons. He called attention to the anæmia of the skin, which is often seen in rapidly spreading sarcomata. In all cases the microscope ought to be employed at once to determine both kind of tumour and the condition of the blood.

Melanosarcoma of the Choroid.—Dr. Charles A. Oliver gave a clinical and histological study of a case. The patient, a man, aged 64, accidentally discovered twenty-six years previously that he was blind in the left eye. With the exception of two slight attacks of disturbance, the eye remained quiet until four months before being seen, when it began to increase in size and became intermittently painful. A nodular mass, which was highly vascular and densely pigmented, protruded between the eyelids. The entire contents of the orbital cavity were removed. They were found to consist of a melanotic sarcoma of the choroid which had broken through an atrophic globe both anteriorly and posteriorly. The mass was filled in many places with blood extravasations and was packed with degenerated neoplastic cells, and there were osseous changes in the tumour itself. The patient apparently enjoyed robust health up to the time of his death from a railway accident three years later, the growth never recurring nor extending, and there never being any evidences of metastasis.

Gumma of the Iris and Ciliary Body.—Dr. de Schweinitz related the history of a case, and demonstrated the specimens from the enucleated eyeball. The growth occupied the area in front of the ciliary body and included the iris to its pupillary margin. It presented the usual histological characters of gumma, and contained in its centre a cyst which had developed from one of the larger ciliary processes. There was adhesive inflammation of the iris periphery on one side, occluding the angle of the anterior chamber, while the growth blocked the angle on

the other side. This occasioned glaucoma, on account of which the eye was enucleated, sight having been destroyed and the usual medicinal measures having failed to cause absorption of the growth.

Discussion.—Dr. C. A. Oliver related a case of recovery from gumma of the iris and ciliary body in a syphilitic patient, aged 57, whose vision had been reduced to $\frac{1}{60}$ principally by infiltrations into the media. Vision was brought to almost normal on three occasions by the employment of heroic doses of mercury by inunction. Dr. Randall spoke of a case in which treatment by mercury and iodide of potassium was of no service, but Donovan's solution was extremely valuable.

The Ocular Findings in Epidemic Cerebro-spinal Meningitis.—Dr. B. K. Chance noted among the early symptoms in a systematic study of the eyes of twenty-three persons suffering from epidemic meningitis, lessening of central vision, photophobia, burning and itching of the lids, with catarrh; in one case there had been diplopia, in another deep orbital pains followed by ptosis and facial paralysis of the left side. The visual testings showed normal acuity in several cases despite the intense congestion of the fundus; in others there was marked diminution along with neuritis. Disturbances of the conjunctiva were seen to be localised and unilateral, and doubtless were due to contamination from outside sources. Abnormal convergence of both eyes was seen in two cases; there was variation in the size of the pupils. No case presented inflammation of cornea or iris, nor was cataract or gross acute change of the choroid or retina observed. The optic discs presented the greatest changes, there being early progressive neuritis.

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RECURRENT PARALYSIS OF THE OCULO-MOTOR NERVE.

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THE comparative rarity of recurrent third nerve paralysis induces me to report the following typical case, although it lacks the final demonstration of the pathological lesion.

Until ten years ago but very few cases had been described, and even yet, from all sources, I can collect only about sixty cases, of which but four were examined *post-mortem*.

The characteristic symptoms of the disease are the sudden onset of unilateral headaches, which may last from days to weeks, and are associated with vomiting, malaise, and sometimes fever. Simultaneously with, or shortly after this, paralysis of the third nerve on the same side appears. This paralysis may be complete or partial, and lasts for a varying time after all the other symptoms have disappeared. There is sometimes paræsthesia in the area of the superior branches of the fifth nerve on the affected side, and the fields of vision show a varying contraction. These paralytic symptoms may entirely disappear to recur suddenly, with the same severe headache, &c., after a period varying from weeks to months, or even years. In other cases the disease takes on an exacerbating form, there being but

incomplete recovery from the paralysis during the intervals between the attacks. In this latter form the tendency is for the disease to become gradually worse, until finally complete permanent oculo-motor paralysis develops. The former type is known as the periodic, there being complete absence of any paralysis during the interval ; but the recorded cases of this type are very few, and it would seem that they almost invariably take on the exacerbating characteristic. The disease generally begins in very early life, even in infancy. At the onset the patient may only complain of severe bilious or migraine-like headaches, and years may elapse before the paralytic symptoms appear.

As to the pathological conditions, it is held by many that the simple periodic type is not associated with any marked organic lesion ; in fact, that it is a functional nerve explosion, dependent on some variety of auto-intoxication. Priestley Smith considers it due to the accumulation of uric acid, and mentions a recovery due to treatment on these principles. Other authorities claim errors of refraction or nasal stenosis as main causes, and quote recoveries resulting from treatment directed against these causes, but the possibility of very long intervals between the attacks leads one to accept such statements with caution. On the other hand, the true exacerbating type is held to be invariably due to some organic lesion.

Wadsworth, of Boston, reports a case associated with chronic suppuration of the middle ear on the same side, in which an onset of the eye symptoms occurred with diminution of the aural discharge, and a disappearance of them with an increase of the discharge. Wadsworth considered a basal meningitis as the cause in his case.

The autopsies so far have been four in number, and in all of these there was marked disease of the nerve trunk. The following are the reports :—

(1) Plastic exudation around the nerve trunk.

(2) Grey granulations containing tubercle bacilli in the nerve trunk.

(3) Fibrochondroma of the nerve.

(4) Small fibroma of the dura mater, involving completely the nerve. The nerve fibres were degenerated, but the nucleus was intact.

The case which came under my notice is as follows :—

Nellie R., aged 14, was first seen by me on May 12 of this year. The child complained of seeing double and of drooping of her left eyelid, which had persisted for two or three days. Four days before she had what she called a severe bilious headache, limited to the left side of her forehead, and which lasted for three days. This was accompanied by vomiting, and on the second morning after the onset she saw double and could not raise her left upper eyelid. She had a similar attack three months ago in the same eye, the symptoms disappearing in the course of a week; and again previous to this, two years ago, after an attack of diphtheria, there was drooping of the left upper eyelid and double vision. There is a history of frequent sick headache since early childhood, occurring nearly every month, but the double vision has only been noticed during the past two years. She has had frequent attacks of sick headache and vomiting since two years, all of which have been accompanied by double vision, but without ptosis, except on the three occasions mentioned. The patient tells me that near vision with the left eye has been defective for years, almost as far back as she can remember. The child is well nourished and of the fair type; rather undeveloped for her years. Mentally she is bright and intelligent. There is no history of any serious illness. Her mother has been in an asylum four or five years, but there is no other family history of any importance, and there seems to be no family tendency to tuberculous infection.

The girl has not yet reached puberty. Her condition on May 12 was as follows :—

Paralysis of the left third nerve in all its branches, excepting that to the sphincter pupillæ, for although widely dilated the pupil reacted sluggishly to light and on convergence, but the accommodation was absolutely paralysed. The eyeball was divergent in position. There was no paræsthesia in the area of the fifth nerve. Vision : right eye $\frac{5}{5}$, pupil active and accommodation good ; a low degree of hypermetropia. Vision : left eye $\frac{5}{9}$, pupils sluggish, widely dilated ; accommodation *nil*. With a spherical + 5 D. she can read J. 1 at eight inches. The light minimum, as tested by Wallace's photometer, is 4° . The fundi are normal. The field of vision shows a general peripheric contraction of 10 to 15 degrees when using a test object 5mm. square.

The knee reflexes, &c., are normal, as are the general body functions.

On June 21 only a slight paresis of the left internal rectus remained. The ptosis had disappeared. There was no divergence of the eyeball. The pupil still reacted sluggishly to light, and the accommodation was still absent.

On July 12 only the pupillary and accommodative phenomena persisted. The light perception was increased to 5° . On August 21 I found that since last seen she has had a slight attack of headache, &c., with double vision, but no ptosis. The symptoms disappeared in a few days, but the accommodative and pupillary symptoms remain unchanged.

My patient forms a typical example of this rather rare malady. There was marked hereditary tendency to nervous instability on the maternal side. As to the pathological lesion one is in the dark, but judging from the experience of others and the marked exacerbating type of the disease, there can be no doubt as to an organic lesion being present, most likely in the nerve

trunk. It seems curious that such a vast majority of the cases of recurring paralysis of the ocular muscles should belong to the oculo-motor group, the sixth and fourth nerve supplying but very few cases. As Gowers pointed out, the sixth nerve, on account of its long course round the pons, is exposed more than the other basal nerves to the effects of any pressure, and its paralysis is a most common distant symptom of intracranial trouble. Yet in these recurrent types of paralysis it almost invariably escapes.

REVIEWS.

K. BAAS (Freiburg). Lens Regeneration in Man.
Münchener Medicinische Wochenschrift, xlviii., 1890.

It is a recognised fact, the recognition being largely due in the first instance to the observations of Colucci and Wolff, that if one removes the lens from an animal sufficiently low in the scale, leaving behind the capsule, a more or less complete attempt at restitution of the crystalline is made; below the level of the rabbit, restoration is fairly satisfactory; certainly in the amphibia the new-formed lens appears to become with time as perfect as the original. Experiments of a similar character have been made in the cat, dog, sheep, rabbit, pig, guinea-pig, &c., of which the following is the practical result:—After the lens is removed, the capsule with its epithelium being left *in situ*, new tissue is formed, this being in some cases confined to the peripheral portions, but in others stretching into the pupillary area. Of this new tissue the formation may be so abundant as to fill up the sac again even to its original bulk, but this is rare, and the original form of the lens is not often preserved; the most usual shape of the new mass is that of a ring or horseshoe, the

thickest portion being peripheral, the thinnest central. At the same time it is certain that the amount of vision present compares very unfavourably with that which had formerly existed, and when the ophthalmoscope can be used at all it gives but a poor and blurred image of the fundus. Microscopic examination of the more transparent portion reveals the presence of a number of fibres, shorter and broader than those of the normal lens, and between them is a somewhat turbid fluid, while fragments of the capsule lie close by. In fact, this "new lens" is little else than portions of the old crystalline lying among remains of the capsule, as seen in the aphakic human eye. Some attempt at reformation does indeed occur, and this to a greater extent the younger the "patient," and the longer the time that has elapsed since the operation was performed, but it is stretching a point to call it regeneration of the lens, since the function is never restored.

A case with which Baas has met, however, shows an attempt at the same process in the human subject, and is on that account worthy of notice. In 1874 a woman, then aged 37, had the operation of discission performed five times upon her right eye on account of progressive loss of vision; at the last of these the capsule, which had been obstructing the whole pupil, was successfully torn through, and the patient obtained about $\frac{2}{6}$ with a suitable lens. She returned to see about the condition of the other eye in 1896, when the first (right) eye was found to retain vision practically as good as it had been twenty-five years before. But in 1899 she again came back, complaining on this occasion that vision was a little less satisfactory, and was interfered with by a small dark spot. The pupil, when dilated with atropin, assumed an oval shape, with long axis vertical, when a small mass of thickened capsule could be seen at its upper outer part, stretching back into the vitreous like a minute hook. At the end of this projecting portion was a small rounded nodule about the size of a pin-head, the whole, with the rounded pedunculated ball stretching from the wall and the connecting neck, looking very like a cysticercus. Even in the stem

of the little formation, transparent contents were evident, while in the globular head the clear material was more manifest, and its edges gave back that peculiar golden sheen so characteristic of the margin of the transparent dislocated lens. The "new lens" appeared to lie at as great a distance behind the iris as was the depth of the anterior chamber, and on throwing light into the pupil from an ophthalmoscopic mirror, the dense "nucleus" executed an "opposite" movement. The vitreous contained a number of floating opacities, and the choroid showed a pathological degree of pigmentation.

W. G. S.

BIETTI (Parma). Regeneration of the Ciliary Nerves after Optico-ciliary Neurectomy. *V. Graefe's Archiv. f. Ophth. xlix., i., 1899.*

Optico-ciliary neurotomy is impotent as a preventive of sympathetic mischief. Optico-ciliary neurectomy, which at first seemed to promise better results, has proved no more trustworthy; even when most efficiently performed it has been followed by sympathetic inflammation, as was shown by a case of Schmidt-Rimpler's, in which as much as one and a half centimetres of the optic nerve had been removed. Bietti's observation recorded here is of considerable interest as throwing light on the cause of the failure of this operation, and indirectly perhaps on the nature of sympathetic inflammation.

The patient was a boy of 14 when his left eye was wounded by a stick; cornea, iris and lens were torn, and the sclerotic was encroached on at each end of the wound. Five years later the eye began to show signs of shrinking, accompanied by slight injection and tenderness; these increasing, optico-ciliary neurectomy was performed, three millimetres of the optic nerve being removed, and the surrounding sclera carefully cleaned. Ten days later, when the stitches were removed, the cornea was absolutely anæsthetic, the movements of the globe good.

Six years later the patient reappeared. A few months

previously, when working for an examination, he had suffered from severe pains referred to the back of the left eye, and the *right* had shown some signs of irritation (flashing, and intolerance of light). At the time of observation the right eye was free from any symptoms. The left eye was considerably shrunken and soft, and nearly quiet; sensation was everywhere present on the surface of the eye, though in varying degree. It was more acute over the upper half than the lower. Touching the upper half of the cornea with a slip of paper caused much lachrymation, pressure here was painful and gave rise to vivid reddening of the globe, which only slowly subsided. After testing of the left eye in this way the patient spontaneously complained of a feeling of pressure over the pupil of the right. The left eye was excised.

The most interesting point brought out by microscopic examination of the eye was the condition of the ciliary nerves. The connective tissue behind the globe was so full of new nerve fibres as to resemble the neuroma on the end of the nerve of an operation stump. Some of the fibres comprising the mass were larger than normal ciliary nerves, others smaller, and others again consisted of single fibrils only. These latter twisted in and out among the larger trunks, occasionally splitting into two to enclose one of them. Many of the nerves entered the sclera, and then occupied the old nerve-channels, though at times two, or even three would be seen in one channel; other fibres had evidently made new channels for themselves as they were found in positions not normally occupied by ciliary nerves; while many, and these particularly the smallest, did not reach the sclera at all. Within the globe the nerves ran very much the usual course until they reached the ciliary region, and there in the atrophic ciliary bodies they were again twisted and tangled together, and decidedly more numerous than is normal.

There were a few small nerves entering the ciliary region anteriorly, but not as definite nerve trunks; they appeared to be formed by the collecting together of single

fibrils accompanying the episcleral vessels. They joined in the ciliary bodies with the nerves entering the latter posteriorly; but it was obvious from their insignificant size that they could not be regarded as the source of the ciliary nerves. The latter evidently had their origin in the abundant new development of nerve fibres pushing forward from the cut ends of the short ciliary nerves.

A comparison obviously suggests itself between the condition of things here described and the well-known tendency shown by other branches of the fifth nerve to fill up even large breaches of their continuity.

W. G. L.

E. A. POLYA (Budapest). On the Condition of the Angle of the Anterior Chamber in Glaucoma.

Ungarische Beiträge zur Augenheilkunde. February, 1900.

In this article, which fills more than a hundred pages, the author describes in elaborate detail, first the anatomy of the structures which form the angle of the anterior chamber, or filtration angle, in the healthy eye, and secondly, the changes which are met with in various forms of glaucoma. It is unnecessary to follow him through the first section of his paper, as it deals only with what other writers have said about the normal anatomy of the parts. The second section describes his own observations of normal eyes, and may be summarised as follows:—

The ciliary muscle varies in form, as was shown by Ivanoff, with the refraction of the eye, so that three types, the emmetropic, the hypermetropic, and the myopic, may be distinguished. But the association is not so close as to enable one to infer any but high degrees of ametropia from the form of the ciliary muscle.

The form of the filtration angle varies with that of the ciliary muscle. Where the muscle is of emmetropic type the filtration angle is wide, and either more or less rectangular or rounded. Its peripheral wall consists of the radial portion of the muscle, and of the sclero-corneal fibres which pass to the muscle and to the connective

tissue of the ciliary processes. The point of origin of the iris is variable. Where the muscle is of hypermetropic type the origin of the iris is displaced inwards, *i.e.*, towards the axis of the eye, and lies, therefore, further from the ciliary muscle. The posterior wall of the filtration angle is formed by the loose connective tissue of the ciliary body, and hence the form of the angle is narrow and pointed rather than rounded. Where the muscle is of myopic type, its circular fibres are ill developed, and the origin of the iris is consequently situated further from the axis of the eye. The connective tissue of the ciliary processes takes little part in the formation of the filtration angle, and the apex of this latter is formed by the sclero-corneal fibres as they pass to the radial fibres of the muscle. The angle itself is rounded and appears at first sight to be not exceptionally wide, but if we regard the distance of the iris from the sclero-corneal boundary we see that it is wider than in the emmetropic type of eye.

Passing to the pathological changes at the filtration angle met with in glaucoma, the author reviews the literature of the subject and supplements it with observations of his own on twenty-three glaucomatous eyes, nine of which had been lost by primary, and fourteen by secondary glaucoma of various kinds. In every case a change was found of a kind which would hinder the escape of the aqueous at the filtration angle, namely, either a closure of the angle, or some change rendering the tissue in the filtration area impermeable.

The commonest condition was closure of the angle, and with regard to the liability to this condition, the author, following previous writers, concludes that it is greatest where the ciliary muscle is of hypermetropic type and the angle naturally narrow, least where the muscle is of myopic type and the angle naturally wide. In all cases inflammatory changes accompanied the closure of the filtration angle. It is a well-known fact that when two epithelial surfaces remain long in contact adhesive inflammation is apt to occur. The author discusses to some extent the causes which may lead to the closure of the

filtration angle, but it is unnecessary to follow him here, as he expressly disclaims such experience as would justify a decision.

In a small minority of cases the author found the filtration angle open, and the tissues in the filtration area altered by changes which apparently rendered them impermeable by the aqueous fluid. These changes were chiefly of inflammatory type, but pigment embolism blocking the meshes of the filtration area was also observed.

P. S.

TRUC (Montpellier) and CAUVIN (Nice). Iridectomy in Glaucoma Simplex. *Arch. d'Ophth.*, January, 1900.

The most noteworthy feature of the paper by these writers is the publication of notes of fourteen cases of quiet chronic glaucoma in which iridectomy was performed, and which remained under observation for periods varying from six months to five and a-half years.

The authors believe that in simple glaucoma only two of the many operations proposed are worthy of retention, viz., iridectomy and anterior sclerotomy. From their study of previous records and their experience, they decide that iridectomy is much the more effective procedure.

After particularising as to the method to be followed in operating, the authors emphasise the necessity of operating early in the disease. Unfortunately cases of chronic painless glaucoma seldom come under observation until the disease is in an advanced stage, or surgical interference is refused because the acuity of vision is still good.

The importance and the difficulty of diagnosing between glaucoma simplex, and optic atrophy with excavation of the papilla, but without any rise of intraocular tension, is fully recognised.

The reaction of the eye to myotics is held to furnish valuable indications. If, under the use of eserine or pilocarpin, the visual acuity increases and the field enlarges, a good prognosis as to the result of iridectomy

may be given; on the other hand, if myotics produce little or no effect, the prognosis is decidedly less favourable. The authors believe that preventive iridectomy is in suitable cases desirable.

In view of the fact that chronic glaucoma almost invariably attacks both eyes, they call attention to the necessity for careful perimetric examination of the supposed sound eye, and are inclined to advise iridectomy if the field show characteristic loss, although central vision may be perfect.

Schoen, who in his writings expressed a sturdy disbelief in the curative effect of iridectomy, has elicited replies from numerous observers, and the writers of this paper refer to most of the recently published articles, *e.g.*, those of de Wecker, Gallenga, Harmloser, Sidler-Huguenin, Coppez, Fuchs, Wagner and others. All these authorities give notes of cases showing that iridectomy in chronic glaucoma gives results which have not been obtained by other methods of treatment, although no one pretends that it is an infallible remedy.

Truc and Cauvin's cases are, in abstract, as follows;—

(1) F., 51. R. v. $\frac{3}{30}$, L. $\frac{3}{7}$; double iridectomy, October, 1894. May, 1897, R. v. 0; L. v. $\frac{3}{7}$.

(2) M., 55. R. v. $\frac{1}{50}$; L. v. $\frac{3}{15}$; double iridectomy, April, 1897. May 1899, R. v. $\frac{1}{50}$, L. v. $\frac{3}{10}$.

(3) M., 63. R. absolute glaucoma, L. v. $\frac{3}{6}$; iridectomy, July, 1896. July, 1899, L. v. unaltered.

(4) F., 56. R. absolute glaucoma, L. v. $\frac{3}{6}$; iridectomy, February, 1898. October, 1899, L. v. $\frac{3}{6}$.

(5) M., 68. R. v. $\frac{3}{10}$, L. v. $\frac{3}{20}$; double iridectomy, November, 1897. April, 1898, R. v. $\frac{3}{7}$, L. v. $<\frac{3}{100}$, lens becoming opaque. November, 1898, L. after extraction of cataract, v. = $\frac{3}{15}$.

(6) M., 65. R. v. $\frac{3}{6}$, L. blind; iridectomy on R., May, 1897. August, 1899, R. v. unaltered.

(7) M., 63. R. v. $\frac{1}{50}$, L. v. $\frac{9}{10}$; double iridectomy, March, 1898. November, 1899, R. and L. v. unaltered.

(8) F., 56. L. v. $\frac{3}{15}$; iridectomy, August, 1898. May, 1899, L. v. $\frac{3}{10}$.

(9) M., 62. R. v. $\frac{3}{10}$, L. v. $\frac{1}{50}$; double iridectomy, August, 1898. November, 1899, R. v. $\frac{3}{7}$, L. $\frac{3}{20}$.

(10) M., 54. R. v. $\frac{3}{7}$, L. v. $\frac{3}{15}$; double iridectomy, August, 1898. October, 1899, R. v. $\frac{3}{7}$, L. v. $\frac{3}{15}$ to $\frac{3}{10}$.

(11) M., 64. R. v. $\frac{3}{15}$, L. blind; R. iridectomy, July, 1898. August, 1899, R. v. $\frac{3}{10}$.

(12) F., 65. R. v. $\frac{7}{10}$; L. v. $\frac{7}{10}$; R. iridectomy, L. sclerotomy, January, 1898. December, 1899, R. v. = 1, L. v. = 1.

(13) M., 62. R. v. $\frac{1}{15}$, L. v. $\frac{3}{5}$; double iridectomy, May, 1899. November, 1899, R. v. $\frac{1}{50}$, L. v. $\frac{3}{5}$.

(14) F., 53. R. v. $\frac{4}{10}$, L. v. $\frac{6}{10}$; double iridectomy, June, 1899. December, 1899, R. v. $\frac{4}{10}$, L. v. $\frac{6}{10}$.

J. B. L.

HILLEMANN'S (Duisburg). Ulcus Corneæ Rodens.

Archiv. fur Augenheilkunde, xl., 1899.

Ulcus rodens, though not infrequently confused by authors with ulcus serpens, is in reality quite distinct from it in many of its clinical features. The rodent ulcer begins at the corneal margin with a delicate grayish-white infiltration, which shortly breaks down into an ulcer; this ulcer intermittently advances, each advance being accompanied with severe ciliary pain, and then again remains for a time stationary; its margin, which is irregular and undermined, is a whitish gray infiltrated line of demarcation; its floor is gray; there is no zone of infiltrated cornea outside the ulcer, and no pus in the anterior chamber (in the earlier stages, at least). The manner of its advance, too, is not that of the ulcus serpens, for it eats its way persistently, though somewhat slowly, round the marginal portions of the cornea as well as inwards towards the centre, till the whole surface may be involved, though it rarely extends deeply and therefore perforation is uncommon; plastic iritis is not a frequent accompaniment. An interesting feature of ulcus rodens is the rapidity with which healing and the reformation of epithelium over the scarred cornea succeeds any cessation of the process; indeed, it may be said that wherever it is not actively advancing it has

healed. Dufour states that the ulcer attacks only the tissue immediately underlying the epithelium, but it may apparently extend somewhat more deeply.

Ulcus rodens may attack persons of any age from 20 to 70 years, but most of the patients have been about 40, and neither sex is peculiarly liable. As a rule, the subjects have been feeble and poorly nourished, but some were quite in good health. A few of the patients have had chronic sac mischief, but obstruction to the duct certainly has not the important influence which it has in hypopyon keratitis. The duration of the disease is apt to be very long, from four to ten months not being excessive, in which respect, as well as in its superficial situation, it differs essentially from the ordinary "marginal ulcer," with its rapid course and its tendency to perforate. Though ulcus rodens is very painful as it advances, since the superficial situation of the nerve endings lays them open to its attacks, yet the corneal sensibility is distinctly reduced by the process, at all events in some of the cases, though the disease has nothing in common with neuro-paralytic keratitis.

Two theories in regard to the pathology are propounded : (1) that it is a progressive necrosis, nervous in origin, of the superficial layers of the cornea, and (2) that to this is added a deposition of cocci under the loosened epithelium. Hillemanns has found in the course of his investigations one or two plugged vessels filled not with blood corpuscles, but with a homogeneous substance ; this suggests to him the analogy—which, however, he does not press, as the objections to it are numerous from all sides—of Virchow's theory of the connection between ulcer of the stomach and thrombosed vessels. The author is inclined to view the condition as one dependent upon an affection of the nerves presiding over the nourishment and vitality of the superficial layers of the cornea.

In respect of treatment there is still much to be desired. Fuchs believes that the cautery is an unfailing cure, but the experience of others does not altogether coincide with his. No method is likely to be satisfactory

which does not include removal of the overhanging edges of the ulcer, so that whatever medicament is applied may reach the actual spreading margin. When this has been accomplished there are many solutions which may be employed; that which has given most satisfaction to the author has been tincture of iodine. He suggests that in some of the very obstinate cases the wisest course to pursue may be to refrain from too active procedure, and rather to employ such mild measures as hot compresses and atropin, since in such circumstances caustic applications, such as iodine, carbolic acid and chlorine water—to say nothing of such operations as transplantation of mucous membrane, sub-conjunctival injections and scraping of the ulcer—are more likely to do harm than good.

W. G. S.

OERTZEN (Rostock). On the Occurrence of Pneumococci upon the Normal Human Conjunctiva. *Klinische Monatsblätter für Augenheilkunde*. Nov., 1899.

The views of different writers as to the frequency with which pneumococci occur in the normal conjunctival sac are so contradictory that the author, at the suggestion of Professor Axenfeld, has been led to make further researches, of which this article is the outcome. To begin with, he remarks that the normal conjunctival sac must be regarded as the habitat of micro-organisms, and that it must be considered possible for any existing micro-organism to be met with in the conjunctival sac.

The most frequent inhabitant of the normal conjunctiva is the xerosis bacillus, although about this there has been great diversity of opinion. Heinersdorff, who obtained it in 80 per cent. of cases, regards it as an almost constant, but harmless, parasite of the normal conjunctiva. Axenfeld says anyone can convince himself as to its frequency by employing good blood-serum, and allowing at least three days in the incubating oven for the cultures to appear. Next to the xerosis bacillus in frequency, and perhaps even as

frequent, is the staphylococcus of slight virulence. Extremely virulent white staphylococci may be met with in the conjunctiva, but not frequently. Morax identifies the staphylococci which he often found with the virulent staphylococcus epidermidis; whilst Cuénod describes it as "analogous to the staphylococcus albus, but inoffensive." Dalen distinguishes two kinds, the staphylococcus pyogenes albus, and what he designates the micrococcus "a"; he found the latter almost constantly, and looks upon it as a weakened variety of the former. Inoculation in a rabbit's cornea produced either no result, or only slight infiltration and ulceration, and never either perforation or hypopyon. Whilst the xerosis bacillus and staphylococcus just mentioned ought now to be universally acknowledged as almost regular parasites of the normal conjunctiva, pneumococci are, however, undoubtedly the most frequent and important cause of ocular infection, and that without injury to the lacrimal passages, as Gasparrini, Parinaud, Morax, Axenfeld, Uhthoff, Cuénod, and others have shown. Yet as regards the frequency with which Fränkel's pneumococcus is met with on the normal conjunctiva there is the greatest diversity of opinion. Franke, Morax, Puccioni, Wolocowitsch, Dalen and the older observers never found it. Uhthoff, Axenfeld and Cuénod have found it only occasionally, and Heinersdorff twice in fifty cases. Gasparrini, on the other hand, asserts that it occurs in a virulent form fairly constantly, and that he has obtained it in 80 per cent. of cases, for the most part accompanied by staphylococci. These are results so unique that the author sought to test them, and to do so he followed Gasparrini's methods exactly, which he describes in detail. The conjunctivæ of 85 individuals (56 men and 29 women) were examined, and 36 animals (16 rabbits, 15 guinea-pigs, 5 white mice) were inoculated. White staphylococci were found in 96.25 per cent. of cases, xerosis bacilli in 57.5 per cent., and other rods in 5 per cent. Pneumococci were only found twice, and then only in the cultures direct from the conjunctival sac. The number of pneumococci found was very small, and the colonies were scarcely

visible drops on the surface of the agar. Not a single animal exhibited a pneumococcal septicæmia. These results are, like those of Axenfeld, Heinersdorff, &c., quite opposite to Gasparrini's, which must be based upon contamination and erroneous observation, and perhaps on confusion with staphylococci. With bouillon cultures from the pneumococci found in the two cases, white mice were inoculated, but without the slightest reaction, and blood preparations and cultures gave equally negative results, so that the germs were non-virulent or had become so. According to these experiments, therefore, the pneumococcus is relatively seldom (4 per cent.) demonstrable in the normal conjunctival sac. In comparison with the frequency of pneumococcal infection the relatively rare occurrence of pneumococci on the normal conjunctiva is of significance, and although the danger may not be great, there is always a possibility of infection, which may arise from germs already present becoming virulent under the influence of colds, &c. Wounds may heal without complication in the presence of micro-organisms, for the latter may be non-virulent, or few, and they may not come in contact with the wound, in addition to which the eye can offer a protective resistance. Every eye-operator must avoid as far as possible all sources of infection, or at least diminish as much as possible the number of germs. We thus come to the old dispute as to antiseptis or asepsis of the normal conjunctiva. Various antiseptics have been employed with very similar results, and antiseptis has only given slightly better results than asepsis. A given mechanical cleansing with an aseptic fluid cannot, however, be the same as with an antiseptic fluid, killing all micro-organisms with which it comes in contact, provided that the latter does not injure the tissues. In the Rostock University Eye-Clinic a mild antiseptis is performed with tepid oxycyanide of mercury solution (1 in 3000), which irritates the tissues very slightly and yet is sufficiently strong.

L. V. CARGILL.

System of Diseases of the Eye. By American, British, Dutch, French, German and Spanish Authors. Edited by Wm. F. Norris and Chas. F. Oliver. Philadelphia and London: J. B. Lippincott Co.

The publication of the fourth volume completes this immense work of nearly 3,200 large octavo pages. Of the 59 authors who contribute articles to it, 11 reside in the United Kingdom, 30 in the United States, 5 in France, 4 each in Austria and Germany, 2 in Holland, and 1 each in Belgium, Switzerland and Cuba.

Any extended review of such a work is here impracticable. Some idea of its plan and extent may be conveyed by a mention of the articles of British authors, and the space occupied by each. These are: Anatomy of the Intra-cranial Portion of the Visual Apparatus, by Alex. Hill, 33 pages. Congenital Malformations and Abnormalities of the Human Eye, by Wm. Lang and E. T. Collins, 41 pages. Diseases of the Iris and Ciliary Body, by W. A. Brailey and S. Stephenson, 79 pages. Diseases of the Choroid and Vitreous, by A. H. Griffith, 59 pages. Glaucoma, by Priestley Smith, 55 pages. Eye-diseases and Eye-symptoms in their Relation to Organic Diseases of the Brain and Spinal Cord, by H. R. Swanzy, 106 pages. Ocular Lesions dependent upon Disorders of the Secretory and Excretory Organs, by J. B. Lawford, 41 pages. Ocular Lesions in Variola, Rubeola, Morbilli, Scarlatina, Erysipelas, and Diphtheria, by John B. Story, 17 pages. Eye-affections due to Graves' Disease and Herpes Zoster, by J. Hutchinson, jun., 19 pages.

This work is really a library of ophthalmic literature. System is a misnomer; for conformity of the various articles to any "system" is conspicuously absent. Neither is it an Encyclopædia. It is rather a collection of monographs, each distinct in style, arrangement and thoroughness. Among them are some which are superior to anything else that has been written on the same subjects: we might mention Nuel's article on Diseases of the Cornea as deserving of special commendation. A few

are distinctly poor and inadequate; notably that of Oliver on Ametropia, which is quite unworthy of a place in the book. The fact that there is some overlapping, two or more authors discussing the same topic, is less of a drawback because it is well to know the views of different authorities on the same subject.

Most of the articles are well illustrated, many of them with coloured plates; and the publisher's part has been well done throughout, including careful proof-reading. The work is one that every ophthalmologist will find well worth having. It must at once take a place among standard works of reference.

PERCIVAL (A. S.) *Optics: a Manual for Students.*
London: Macmillan & Co. 1899.

To those students of ophthalmology who are specially fond of optics and can climb the heights of mathematics this volume will be most welcome, collecting as it does from the best sources what would otherwise have to be searched for in half-a-dozen volumes. The cardinal points and planes are well described, and also the effect of correcting lenses on the size of retinal images. It is about the simplest and handiest book of reference on these subjects that an ophthalmic surgeon can have, and the book bears evidence throughout of a good Cambridge training in mathematics. As its name implies, it is a book on optics, not on ophthalmology, and its strongest chapters deal with oblique reflection and caustics, which have little practical bearing in ophthalmology, though their treatment is to be admired.

On the other hand, the theory of ophthalmology and retinoscopy is but slightly entered into, as compared with the works of Berry, Jackson and others. Few books on optics are written in so pleasant a style, and none cover quite the same ground, so that it deserves to find a good place in the ophthalmological library.

SUTER (Washington). *Hand-book of Optics for Students of Ophthalmology.* New York and London: The Macmillan Co. 1899.

This agreeably presented little volume of about 200 pages appears well suited for those who desire by the employment of simple algebraical methods, and without the aid of the higher mathematics, to trace out the foundation principles of optics to their logical issues in practical ophthalmology. Though the processes are sometimes a little lengthy, and might often be made more graphic, the book is unusually readable.

The first three chapters treat of refraction at plane and curved surfaces, and through lenses. Chapter IV. treats very clearly of the eye as an optical system, leading up to the "reduced eye" of Listing and of Donders. The most interesting chapters in the book are VI. and VII., dealing as they do with three questions of great importance in practice, namely, the refraction of aphakic eyes which were previously ametropic; the effect on the power of a lens of its distance from the cornea; and the effects of ametropia, and of correcting lenses on the size of retinal images.

The statement, however, that advancing a presbyopic convex lens further from the eye during the act of reading does not increase the size of the retinal image, is not correct for all lenses and for all distances.

The remaining chapters treat of cylindrical lenses, oblique refraction through lenses, prismatic glasses, reflection, and very briefly of ophthalmometry and ophthalmoscopy. The author has evidently devoted special study of an original kind to the problems of crossed cylinders, and has added another to the several solutions already in existence. Taken as a whole, the book fills a gap, and fills it well.

CLINICAL NOTES.

A NEW APPARATUS FOR THE DETECTION OF ASTIGMATISM.—Many are the devices suggested for this purpose, the fate of the most of them probably being that except the originator of a device few surgeons ever employ it. Langie, of Cracow, brings forward another, which is of course simply a modification of many. He arranges in a line alternate squares of black and white of such size that, if the eye is correctly adapted for the distance at which the column is placed, they are correctly distinguished, but if astigmatism be present, a blurred continuous dark line is all that can be made out. This is fitted to a large circular piece of board so as to rotate about its centre; on the other face of the board is a scale in degrees, and a pointer working also from the centre, and moving as the column with its cross-bars moves; thus showing at a glance the positions of best and worst visibility of the column—in other words, the two “vital” meridians.—*Recueil d'Ophthalmologie*, December, 1899.

CATARACT FORMATION AFTER HÆMORRHAGE. — Since every cataract is due to diminution in the activity of nutrition of the lens, it would not be strange if severe hæmorrhage were followed by its formation, yet we never hear of this complication occurring. Pihl, of Gothenburg, who publishes this case, can find record of no other. A single woman of 33 complained that in three days a thick mist had gathered before her eyes. She was nervous and excitable, but in good enough health; her family history was good except that her mother had been insane; neither “bleeders” nor blind persons were known among her relatives. She herself had been anæmic ever since an attack of enteric fever, and her menses were irregular, painful and very severe. After very severe toothache, which greatly reduced her strength, she underwent the removal of several teeth, an operation attended with copious hæmorrhage, renewed after some days. Then abundant menstrual loss followed, after which patient was able to see quite well for about three days; but rapid loss

of vision ensued, and in three days cataract had formed in both eyes. Operation was followed by a good result.—*Centralblatt für praktische Augenheilkunde*, January, 1900.

TUBERCULOSIS OF THE RETINA.—Localised tuberculosis of certain parts of the eye is not uncommon, but a tubercular affection limited to the retina is probably very rare. A healthy, well nourished looking girl of 21, stated that three months before she came under observation she had very rapidly—in one night—lost the sight of the right eye. In part of the nasal field she was able to count fingers. Ophthalmoscopically this eye showed intense optic neuritis, but with an immensely swollen disc, which was of a brilliant whiteness. The appearance of the disc was indeed not unlike that of detached retina, but the vessels were tortuous and dilated; there were also a few white spots in the retina near the macula. Subsequently the eye was removed, and showed at the posterior part of the retina, and for some distance round the entrance of the optic nerve, a tumour $\frac{1}{3}$ of an inch in diameter, and about $\frac{1}{5}$ of an inch in depth. For some distance round the retina was detached, and a firm homogeneous coagulum lay between it and the choroid. Microscopically the tumour was found to consist of typical tubercular tissue, which passed without a break into the inner layers of the retina. This contained much larger vessels than usual, and through it were scattered numerous small nodules which also appeared to be tubercular in nature.—Story and O'Sullivan, *Transactions of the Royal Academy of Medicine in Ireland*, vol. xvii., 1899.

PECULIAR VISUAL PERVERSION.—Hotz, of Chicago, reports two very singular cases in which perversions of vision occurred. A girl of 10 was given by her mother some "medicine" for nocturnal enuresis; after she had taken this for a week it was found that, though unable to read with the book in the usual position, she could do so when it was held upside down; at 20 feet the letters on the test card appeared to her to be inverted, but she read them all when it was held upside down. This peculiarity ceased

when + 2.5 D. was held before the eyes. A boy of 6 had similar symptoms, though he had had no medicine; he read well for his age when the book was rotated 90°, or even when held upside down, but not at all when right side up; at 20 feet the letters, however, appeared to him in their normal position. In both cases the symptoms passed off after atropin had been instilled, and both patients recovered.—*Ophthalmic Record, Chicago, January, 1900.*

ACQUIRED COLOUR-BLINDNESS.—A case of considerable interest, as helping in the localisation of the centres for colour, has recently been published. It is that of a man of 62, who had always been particularly fond of flowers and able to recognise fine differences in tints, so that he had good colour-knowledge as well as colour-sense. One morning he felt a sudden difficulty in reading his letters, and on the same day was found to be entirely colour-blind; all coloured objects appeared to him gray. Vision was at the same time quite good, but the fields when carefully tested were found much restricted, the appearances suggesting a double hemianopsia, worse in the left halves. He had no word-blindness, he had not completely lost form-sense in the minute fields which remained to him, but all colour-sense was and remained lost till he died with a right hemiplegia. *Post mortem*: There was seen distinct reduction in size of the whole right occipital lobe, with atrophy of the posterior part of the temporo-occipital or fusiform convolution; there was no affection of the gray matter of the calcarine fissure, but there was atrophy of the lower edge of the optic radiation. On the left side the lesion in the occipital lobe was similar in nature to that of the right, but not quite so extensive. According to Mackay and Dunlop, who report the case, it seems to suggest that chromatic stimuli, after being first received in the calcarine fissure, are interpreted in the fusiform convolution; the lesion in this case was of sufficient extent to destroy, not the macular fibres, but the indirect vision fibres partially, and the fibres conveying chromatic stimuli from their first "exchange" in the calcarine fissure to the

fusiform convolution. This would bear out the theory held by some, that the function of the fusiform lobule is connected with colour-perception. But the authors also admit that it is quite possible that the loss of colour-sense in their case may have been due merely to a general depression of the function of vision, sufficiently bad to do this and seriously to interfere with the fields of vision, though not destroying central (macular) vision. The former they consider the more probable hypothesis.—*Scottish Medical and Surgical Journal*, December, 1899.

EYE AFFECTIONS IN PERSONS WHO WORK WITH HYACINTH BULBS.—Among the workers in the great nursery gardens round Haarlem, Zeper says that a certain form of irritation of the skin and eyes is well recognised; in particular it seems to attack those engaged in separating the young hyacinths from the parent bulbs. The symptoms are those of irritation of the conjunctiva, even amounting to conjunctivitis, and severe itching of the skin, especially over the hands and face. Two further facts came out on investigation, viz., that August and September are the chief months in which this occurs, and that no other plant is so injurious as the hyacinth. There are two forms of the disease, known as the old and the new. In the "old" disease the workers recognise a peculiar appearance as of a small eel upon the bulb, hence also called *Aelchenkrankheit*, which upon microscopic examination exhibits a number of minute worms which speedily die on removal from the bulb; they are readily enough stained with various reagents. The "new" disease, also parasitic, is recognised under the microscope by the presence in the bulb of masses of hard and brittle crystals; these may be found both in unsound and in apparently healthy bulbs, and suggest the existence of some cause of irritation. In August and September, when the workers are busy with their dry bulbs, separating and arranging the young growth, much dust is scattered, and in this dust Zeper has discovered eggs, larvæ, and a full-grown mite, which is about the size of the cheese mite; evidently the skin

irritation in the workers is due to this parasite having made its way into the skin of the hands and there died, though the author admits that as yet, at any rate, he has not succeeded in finding the six-footed larva either in skin or conjunctiva of any of his patients.—*Klinische Monatsblätter für Augenheilkunde*, December, 1899.

PARALYSIS OF VERTICAL MOVEMENT.—Teillais, of Nantes, relates a very interesting case on this rare pathological condition. It was that of a man of 60, who had had syphilis and who was actually suffering from diabetes, a condition, however, which had been much benefited by treatment at Vichy, notwithstanding which sugar was still present in the urine in small quantity. During the night he had about four months previously become comatose while asleep and without any preliminary symptoms; no paralysis of limbs resulted, but he had remained unconscious for about a month. When Teillais saw him, four months later, his attitude was somewhat singular, for he constantly remained gazing fixedly at the horizon straight before him, while the head was kept fixed rigidly in the "eyes front" position, because he could not see well in any other attitude, he affirmed. It was found on examination that there was no power of either upward or downward movement of the eyes, either together or singly, while lateral motion was performed with normal readiness. At the same time vision was good, colour perception was unaffected, the fields were perfect, and all pupil reactions were normal. The author considers the lesion to be most probably situated in the median and posterior portions of the oculo-motor nucleus.—*Annales d'Oculistique*, July, 1899.

AN UNUSUAL SYMPTOM IN OPTIC ATROPHY.—A patient, a married woman, presented herself before Noiszewski making the following singular statement: "I cannot see light from dark, I cannot tell day from night, I cannot make out whether or not a lamp is burning, but I can distinguish even a small object if it is blue; I can see the blue forget-me-not in the meadows, I can find the violets in the wood, I can tell if my friend has a blue ribbon in

her hair." The disease began seven years previously, and for the last three she had been in this condition. She had undergone much treatment but without any success. Noiszewski was able to confirm that, though she had no p.l., and the discs were in a condition of advanced white atrophy, yet she was certainly able to perceive blue objects. He even succeeded in taking a chart of her field for blue. The author suggests that the perception of different colours may be the function of different layers of the retina, and that the atrophic process may have destroyed the outer (red-perceiving) layers, but left uninjured the inner (blue-perceiving) portions of the retina.—*St. Petersburg Medicinische Wochenschrift*, lii., 1899.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, MARCH 8, 1900.

Mr. G. ANDERSON CRITCHETT, President, in the Chair.

Family Tendency to Ophthalmoplegia Externa.—Mr. W. M. Beaumont read this paper, which was illustrated by a family tree extending over four generations. No less than twelve members of the family, five being male and seven female, were shown, either by direct observation or reliable evidence, to have suffered from a greater or less degree of ophthalmoplegia externa, ptosis being reckoned as one of the symptoms of that disease. In these cases "the disease was never congenital, but always appeared in adult life, was slowly progressive, and never appears to have had a fatal termination. There is no Graves's disease in the family, and their characteristics are long life and troops of children."

Mr. Cross confirmed Mr. Beaumont's account with regard to one or two of these patients, by whom he had himself been consulted. There was no doubt whatever that they were suffering from ophthalmoplegia externa. Although the muscles were only partially paralysed, every one of them was affected.

Meningitis followed by Panophthalmitis.—Mr. A. Q. Silcock related a case in which, during the course of a meningitis, first one eye and then the other became infected with suppurating panophthalmitis. *Post mortem*, there was found in the eyes, meninges, and on the aortic valves, streptococcus lanceolatus.

What was the mechanism by which the eyes had become infected? Either by extension from the meninges, by embolism, or by septicæmia.

The President said that probably most members had had cases where one eye had been lost in association with septicæmia, but he had never seen a case nor heard of one till that evening, where both eyes were lost through it.

Destructive Uveitis in one eye associated with Meningitis.—

Mr. Cross read notes and exhibited the specimen from a case of this condition. The patient, who was a boy of 12, had been seen two years previously by Dr. Rayner Batten in consultation, and at that time his was apparently a sporadic case of epidemic cerebro-spinal meningitis. "The same morbid process which caused the delirium, the retraction of the head, and the purpura, appears to have started an intraocular inflammation, which culminated in gradual destruction of the sight with degeneration of the eyeball."

Mr. Nettleship said he had from time to time seen cases similar to that mentioned by Mr. Cross. In one the meningitis had resulted from middle-ear disease. He called attention to two features in these cases of septic irido-cyclitis. One was that quite early in the attack there was an appearance as though patches of lymph had been smeared over the anterior surface of the iris without any hypopyon; the other was that this lymph was quickly absorbed and did not reappear, though the destructive process in the interior of the eye went on.

Mr. Treacher Collins referred to another case which had resulted from ear disease in a child. The appearance of the eye gave rise to the suspicion of glioma, so that it was excised. There had been acute irido-cyclitis with much yellow exudation into the vitreous. At the *post mortem* much yellow lymph was found on the meninges, and microscopically he had been able to trace inflammatory exudation down the optic nerve to the stump which had been left in the orbit.

Mr. Holmes Spicer mentioned a case of double panophthalmitis in a woman occurring just after a three months' abortion. It was concluded that the affection in the two eyes was pyæmic, probably embolic, and that its source was the decomposing foetus in the uterus.

Mr. Silcock, in reply, regretted that in none of the cases which had been mentioned had any bacteriological examination been made.

Pigmented Tumour of the Eyeball and Death from Multiple Pigmented Carcinomata, nearly Fourteen Years after Excision of the

Eye.—This paper was contributed jointly by Mr. J. Herbert Fisher and Dr. Charles R. Box. After referring to the evidence of the occurrence of intraocular primary carcinomata which had accumulated since the discovery by Mr. Treacher Collins of the possibility of bleaching the glandular cells of the ciliary body—evidence which, by the way, is ignored in Norris and Oliver's "Textbook"—the authors related the following remarkable case. In 1885, a man of 42 was admitted to St. Thomas's Hospital for a tumour in the ciliary region of the right eye. The eye was excised and the contents of the orbit removed down to the bone. No microscopical examination of the growth was made, but it was regarded as a melanotic sarcoma, and the eye was preserved in Müller's fluid. In 1899 the patient was re-admitted into St. Thomas's Hospital suffering from an abdominal tumour. He died, and *post mortem* the liver was found to be enormously enlarged and its proper substance largely replaced by darkly pigmented new deposits. Smaller nodules were found in the parietal pleura of the left side, the interior of the heart, the visceral pericardium and the cortex of one kidney. Microscopical examination revealed the unexpected fact that the growth in the liver was undoubtedly carcinomatous, the cells being definitely epithelial in type, and presenting a characteristic alveolar arrangement. This "interesting surprise" led to a re-examination of the eye, which had been lying in Muller's fluid for fourteen years. A microscopical examination was undertaken by Mr. Treacher Collins. The following are extracts from his report:—

"The intra-ocular portion of the growth is mainly situated in the ciliary processes, which are considerably distended and enlarged by it. Everywhere the unpigmented layer of the *pars ciliaris retinae* can be traced on its inner surface, though in places the pigmented layer has become merged in the growth. . . . The intraocular portion of the growth is composed of some very densely pigmented areas, and of others with only a small amount of pigment in them. In the former the shape and arrangement of the cells can only be made out after the sections have been bleached with chlorine; they are not, however, found to differ materially from the less pigmented areas. . . . The cells composing the growth are of a very small epithelial type, polygonal, with a large nucleus. They present a very definite arrangement in a number of little groups, composed of parallel rows of cells. The space between two parallel rows varies in size, but is never very great, and in some places the rows seem to be in contact with one another. In a few places rings of cells can be seen surrounding a central lumen. In brief, the appear-

ance of the growth is that of a number of small gland tubules, massed closely together, and cut in various directions."

In the discussion which ensued Mr. Treacher Collins remarked that the only two epithelial structures in the body which are normally pigmented are the skin and the eye, and as in this case the secondary tumours were undoubtedly epithelial and pigmented, and as there was certainly no epithelioma of the skin, the probability of the melanotic growth in the eye being carcinomatous was considerable. The crucial point was as to its microscopical character. In his opinion the growth was a primary carcinoma of the ciliary body, and the case was interesting because it was the first of the sort in which the patient had been definitely known to have recurrence in other organs.

Mr. Marshall admitted that the secondary growths were undoubtedly carcinomatous, but after a merely cursory examination did not feel prepared to offer an opinion as to the nature of the intraocular growth. The length of time was decidedly against the idea of its being carcinoma.

On the suggestion of Mr. Spicer the case was referred to a pathological committee.

Green Vision.—Mr. H. Work Dodd read a paper on this subject. The following card specimens were shown :—

New Growth in Macular Region (? tubercular).—Mr. Lawford.

Unusual Changes in the Macular Region.—Mr. E. Treacher Collins.

Central Senile Choroiditis (? Tay's).—Mr. N. Bishop Harman.

FRENCH SOCIETY OF OPHTHALMOLOGY.

DECEMBER, 1899.

Annales d'Oculistique, December, 1899.

Apropos of the subject of extraction with a conjunctival bridge, Terson mentioned that this method used to be employed by Alexander, surgeon to R. L. O. H., London ; a description of it was published in 1823.

Rupture of the Choroid.—M. Masselon described the case of a youth of 18, who two years previously had shot himself with a revolver in the left temple. The sight of the left eye was quite lost, and that of the right very feeble, even the little that remained disappearing after attempts with a probe to discover the route taken by the ball, but in a fortnight some vision began to return. As the blood clots in the vitreous cleared away, a rupture of the choroid was seen, and retinitis proliferans ; in the left eye the disc

was quite white but the vessels of normal calibre. Examination by Röntgen rays showed that the bullet had been arrested in the sphenoidal sinus, to the right of the middle line, a discovery which indicates the danger of rash probing, and the great localising value of the X-rays.

Chancre of the Conjunctiva.—M. Sulzer showed an infant of 8 months, who a month previously had been the subject of a pseudo-membranous inflammation of the inferior tarsal conjunctiva in the discharge from which he found pneumococci. After a few days the central part became hardened, and the auricular glands enlarged. The only symptom affecting the nursing mother was a slight inflammation of the pharynx, which had been thought previously to be simple.

Symmetrical marginal Dystrophy of the Cornea.—M. Terrien related the case of a man whose vision had been failing for some years in one eye, and the other was now beginning to go. At the upper part of each cornea was an area resembling an arcus, appearing as though ulcerated, but not staining with fluorescein, and being in reality a hypertrophy. This had produced as much as 11 D. of inverse myopic astigmatism, and vision, which had been good, was now only $\frac{1}{50}$. In the left eye the same condition was in a much less advanced stage, and with only 1.5 D. of astigmatism, vision reached $\frac{1}{10}$. Terrien had not been able to discover any germs in the hypertrophied tissue; application of the actual cautery produced considerable improvement, for the astigmatism after six *séances*, had been done away with, and vision risen to $\frac{1}{3}$.

M. Parent and M. Sulzer thought it extraordinary that so very grave diminution of vision could be produced by astigmatism alone.

Cystic Dilatation of the Frontal Sinus.—M. Valude, in a paper on this subject, strongly advocated treatment by free incision, curetting of the walls of the cavity and drainage into the nose. He had not found any advantage in these cases from radiography as a means of diagnosis. M. Suarez de Mendoza, on the contrary, considered that the employment of the X-rays gave valuable information. M. Galezowski was of opinion that in all cases treatment directed to an arthritic or syphilitic taint was indicated in addition to any local procedure.

Enophthalmos after Operation for Cataract.—M. Chevallereau described a case in which this occurrence took place in a woman of 85, in quite good health. The sinking of the globe, along with a considerable degree of lowering of the tension, was noticed on the sixth day after operation. The symptoms passed gradually away, and good vision was obtained.

TWO CASES OF TRAUMATIC ANIRIDIA, IN

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tension was slightly increased, there was some lachrymation but not much pain.

Treatment.—Purge, rest in bed, fomentations, eserine and cocaine.

was quite white but the vessels of normal calibre. Examination by Röntgen rays showed that the bullet had been arrested in the sphenoidal sinus, to the right of the middle line, a discovery which indicates the danger of rash probing, and the great localising value of the X-rays.

Chancre of the Conjunctiva.—M. Sulzer showed an infant of 8 months, who a month previously had been the subject of a pseudo-membranous inflammation of the inferior tarsal conjunctiva in the discharge from which he found pneumococci. After a few

of 85, in quite good health. The sinking of the globe, along with a considerable degree of lowering of the tension, was noticed on the sixth day after operation. The symptoms passed gradually away, and good vision was obtained.

TWO CASES OF TRAUMATIC ANIRIDIA, IN
ONE THE ANIRIDIA BEING COMPLETE,
AND THE LENS PRACTICALLY UNIN-
JURED; IN THE OTHER THE LENS
BEING LOST, BUT A SMALL PIECE OF
IRIS REMAINING.

BY JOHN ROWAN, M.B.

ASSISTANT-SURGEON, GLASGOW OPHTHALMIC INSTITUTION, GLASGOW
ROYAL INFIRMARY.

J. W., aged 35, a blacksmith, was admitted to the
Ophthalmic Institution on July 12 last.

On July 7 a piece of steel about three-eighths of an
inch square flew off the hammer and struck him on
the right eye so forcibly that he fell down, but the
eyelids, &c., were not injured. He was able to return
to work on the 8th, *i.e.*, next day, though he saw
almost nothing with this eye.

Although suffering pain in this eye, he continued
at work till the 12th. On that day, when he was pulling
a steel stud out of a bolster, it suddenly flew out and
struck him on the injured eye. On admission a small
wound was seen at the upper and inner part of the
cornea of the right eye. The anterior chamber was
full of blood, and he could only distinguish bright
light and shade.

Tension was slightly increased, there was some
lachrymation but not much pain.

Treatment.—Purge, rest in bed, fomentations, eserine
and cocaine.

July 15.—Improved, still only sees light and shade ; wound healing, no pain.

July 18.—Eye quiet, sees only light and shade ; no pain, still blood in anterior chamber.

July 21.—Sees fingers at $2\frac{1}{2}$ metres. Left eye, lachrymation and pericorneal injection.

July 24.—Improving ; sees clearer.

July 27.—Counts fingers at 5 metres. Slight lachrymation, no pain. Aniridia, and at that time I thought the lens was dislocated ; the blood in the anterior chamber had only been very partially absorbed, and so a clear view of the condition was impossible, the upper part only being visible.

Before the patient was dismissed as an indoor case on August 4, I noted that the blood in the anterior chamber having almost disappeared, a more complete examination is possible. There is a wound on the anterior surface of the cornea at its upper part ; directly behind this wound there is a small white mark with blood staining on the anterior capsule of the lens. The iris is practically invisible ; there are some opacities scattered through the lens, the fundus is fairly well seen, veins and arteries somewhat full, deep physiological cupping, venous pulsation.

R. v. = $\frac{4}{80}$ cum + 2 D. sph. = $\frac{6}{24}$ = J. 10 (with difficulty) cum + 3 D. sph. = J. 4.

Left (the uninjured eye).—Deep physiological cupping, veins somewhat full, venous pulsation, fundus otherwise normal.

L. v. = ; J. 1.

August 21.—R. v. = $\frac{6}{36}$. J. 14 at 36 cm. L. v. = $\frac{6}{6}$; J. 1.

October 4.—R. v. = $\frac{6}{36}$. L. v. = $\frac{6}{9}$.

October 10.—R. v. $\frac{6}{6}$, cum + 2 D. sph. = $\frac{6}{18}$; J. 6 at 26 cm., and cum + 3 D. sph. = J. 4. L. v. = $\frac{6}{6}$ MH. 5 D. ; J. 1.

In this eye there is lachrymation, it is somewhat tender, and he cannot read long. Deep physiological cupping, veins somewhat full, venous pulsation, fundus otherwise normal, *i.e.*, ophthalmoscopic examination same as at previous note.

October 25.—R. v. = $\frac{6}{36}$; J. 14. L. v. = $\frac{6}{9}$; J. 2.

Present Condition (November 3, 1899).—Looked at in an ordinary way the eye appears dark in colour, just like the pupil of the left eye. Patient and his friends are quite sure the eyes were of the same colour before the accident.

By focal illumination there is seen on the cornea the slightly curved white scar of the wound about 3 mm. in length, and just behind it the pear-shaped blood-stained opacity on the anterior capsule of the lens, with slight opacities radiating from its base. On examination by the direct method with a high plus lens behind the ophthalmoscope, the small torn roots of the iris are seen, and the apparently dark edge of the lens. By causing the patient to move his eye in different directions it is easily seen that this condition extends all round; scattered through the lens are numerous small opacities, as well as the larger opacity described above.

The fundus, which is clearly seen, shows deep physiological cupping; the veins are somewhat full, venous pulsation, otherwise practically normal.

R. v. = $\frac{6}{24}$, not improved by spherical lenses, there is .5 D. corneal astigmatism; = J. 8 at 18 cm.; by putting a disc with a small hole in it in front of the eye, *i.e.*, supplying it with an artificial pupil, he reads J. 4, a + lens does not assist him. The disc does not improve his distant vision.

L. v. = $\frac{6}{9}$ not improved by spherical lenses, 1.25 D. corneal astigmatism. Fundus same as at previous notes, though lately he has complained more of this eye, saying it is weak and watery.

I tried eserine for some days, though with little hope, to see if it would act in any way on the remains of the iris; it caused considerable pain but otherwise had no effect. In regard to the question of a foreign body remaining in the eye, an X-ray photograph gave a negative result.

The most probable of the many explanations that have suggested themselves seems to me to be, that the iris got injured or detached by the first blow, and that in some way the piece of steel which caused the second accident cut the cornea and carried the iris out; the first accident having been, as far as can be ascertained, a direct blow, not cutting the lids or cornea in any way. The theory of this being a case of congenital aniridia cannot stand. The so-called ligament of the lens is well seen in its whole circumference. Another interesting point is that the patient retains the power of accommodation, and this, as noted above, is assisted by supplying him with an artificial pupil.

The second case occurred first in point of time, coming under my care at the Glasgow Ophthalmic Institution on January 4, 1896.

C. McL., aged 68, a blacksmith, was admitted on that date with a history of an accident to his left eye three days previously. As he was knocked insensible he could not give a clear history, but from all that could be ascertained the accident was due to a kick from a boot heel, *i.e.*, a blunt instrument. The right eye was lost five years ago, the result of an accident, only a shrunken stump remaining, but which he refused to have removed. His left eye was injured fourteen years ago, and this injury probably accounts for the corneal opacities mentioned later. The sight in it, according to his account, has always been weak since. Dr. Mackie, of Elgin, sent a note with him saying he had excised part of the iris, which was protruding, and

bandaged the eye antiseptically, but this was not till two days after the accident.

On admission the eye was quite soft, full of blood and very painful, the upper and outer part of the sclerotic in the ciliary region being ruptured, but no details could be seen.

Treatment.—Rest in bed, supporting bandage, and eye kept aseptic.

February 13, 1896.—Steady improvement; patient has been up for some time and going about. There are 4 D. of corneal astigmatism.

$$\text{L. v. cum } \frac{+ 11 \text{ D. sph.}}{+ 4 \text{ D. cyl. ax. } 145^\circ \text{ down and out}} = \frac{5}{60}.$$

$$\text{cum } \frac{+ 15 \text{ D. sph.}}{+ 4 \text{ D. cyl. ax. } 145^\circ \text{ down and out}} = \text{J. 14.}$$

There is only a small piece of the iris left. It is situated downwards and inwards. There are slight corneal opacities; the conjunctival injection is passing off.

April 15, 1896.

$$\text{L. v. cum } \frac{+ 10 \text{ D. sph.}}{+ 4 \text{ D. cyl. ax. vert.}} = \frac{6}{18}.$$

$$\text{L. v. cum } \frac{+ 14 \text{ D. sph.}}{+ 4 \text{ D. cyl. ax. vert.}} = \text{J. 4 at 24 cm.}$$

The following rough sketch gives a better idea of the condition than a description would.



With the ophthalmoscope the optic disc appears oval. There are still vitreous opacities, and one streak extending downwards from the optic disc is very suggestive of rupture.

August 9, 1897, i.e., a year and eight months after the accident,

L. v. cum glasses as above = $\frac{6}{18}$ (l.).

L. v. cum reading glasses as above = J. 1 at 20 c.m.

2 D. of corneal astigmatism and

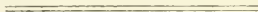
$$\text{L. v. cum } \frac{+ 10 \text{ D. sph.}}{+ 2 \text{ D. cyl. ax. } 75^\circ \text{ down and in}} = \frac{6}{9}.$$

His reading glasses could not be improved on.

Externally, the pigment in the rupture scar is much less marked, with the ophthalmoscope the fundus is clearly seen, the vitreous opacities having been absorbed.

This case appears to me interesting from the point of view of conservative surgery, as on admission the eye condition appeared very hopeless; but as the other eye was useless, there could be no doubt of the line of treatment. It is also interesting to note the diminution of the corneal astigmatism.

These two cases taken together show, I think, the power of recovery in a remarkable degree, and while no doubt the eyes are permanently injured they are of no little service to their owners; in the last case especially, being the patient's only eye, it enables him with suitable glasses to read, write, and superintend his business.



REVIEWS.

ALLARD. Treatment of Glaucoma Simplex by Galvanisation of the Cervical Sympathetic. *La Clinique Ophthalmologique*, October 25, 1899.

Noticing the marked benefit to patients suffering from exophthalmic goitre brought about by the application of rather vigorous galvanisation of the sympathetic cord in the neck, it has occurred to Allard to employ the same treatment in cases of glaucoma, and he has found great benefit from so doing. He says, and with justice, that if resection of the sympathetic has been found so beneficial in both of these conditions by reason of its total suppression (so to speak) of the activity of the sympathetic cord, it is well worth while to try whether a measure milder in itself and much less likely to be followed by effects so injurious, might not be equally efficacious. He finds it perfectly possible by means of galvanism so to modify the excitability of the sympathetic as to benefit greatly, or even to cure cases of exophthalmic goitre, and he has lately employed the same means against glaucoma. The large electrode of the negative pole is placed on the back of the neck, the positive is connected with a strip of metal covered with amadou and chamois leather; along the line of the sympathetic in the neck is laid a pad of cotton wool soaked in warm water, and on this is placed the positive pole, the whole being kept in place by a bandage. If the amount borne is 15 milliamperes he passes this for twenty minutes, if 20 can be stood he allows only fifteen minutes; during the period the current must be interrupted from time to time, and any disagreeable symptoms such as headache and giddiness carefully avoided; should they occur, the current has been unwisely strong or too long continued. For the success of the treatment it is necessary to avoid any over stimulation, as this would bring about a result exactly the contrary of that desired. He

gives details of ten cases which he has treated on this plan, having as a general rule three *séances* a week. Two of his patients were already blind, and the purpose of treatment was to endeavour to obtain relief from the distressing pains, and this object was satisfactorily attained; one case in which progress had been very rapid was arrested. Two cases were markedly improved after twelve or fifteen applications, and two other patients who were only in the initial stages recovered their visual acuity and fields, and in fact might be considered cured after fifteen or twenty applications. His results do not appear very brilliant, though satisfactory so far; perhaps they are the more to be trusted for that circumstance.

W. G. S.

- (1) MOHR (Tübingen). Extirpation of the Superior Cervical Ganglion of the Sympathetic in Glaucoma.
- (2) LANGENDORFF (Rostock). The Relations of the Superior Cervical Ganglion to the Eye and the Vessels of the Head. *Klinische Monatsblätter für Augenheilkunde*, March, 1900.

(1) The following cases of extirpation of the superior cervical ganglion for chronic glaucoma will be welcome as additions to our still scanty clinical experience of this method of treatment.

CASE I.—A healthy peasant, aged 50, had lost the sight of the right eye in 1896 from acute glaucoma following a blow. The left eye was at that time normal in all respects. In July, 1898, he complained of mistiness of vision of the left, and it was found that with normal tension, deep anterior chamber, central vision of $\frac{5}{5}$, and full field, there was already deep excavation of the disc, and the diagnosis of simple glaucoma was made.

In spite of the use of eserine, functional deterioration steadily advanced, so that in September, 1899, vision was $\frac{5}{15}$, and the field was contracted to 5° from the fixation

point in all meridians. The pupil was half-wide, and the tension was slightly higher than normal when not under eserine.

On September 3, 1899, Professor Hofmeister removed the superior cervical ganglion on the left side. The pupil showed no change during resection of the ganglion, nor did the tension fall. The healing of the wound in this, and in the subsequent cases, was in every way regular.

On the ninth day after the operation it was found that the central vision had improved slightly, and the field had enlarged up to 10° in all meridians. There was distinct myosis and the tension was about normal. No change in the ophthalmoscopic appearances, no ptosis, and no enophthalmos.

A month later the field of vision had further enlarged, to 30° up, 15° in, 10° down, and 30° out. The patient now left the hospital, and in spite of injunctions did not come up for observation; but from the fact that he had returned to his work in the fields (which he had been unable to do for some months previously) it was presumable that the improvement was maintained.

Two and a half months after the operation, however, he presented himself at the clinique, with the account that ten days previously his sight had rapidly failed without obvious cause. The left eye now presented symptoms of moderately acute glaucoma, with considerable pain, some reddening of the globe and œdema of the corneal epithelium; tension $+ \frac{1}{2}$; the anterior chamber was still deep, the pupil small and acting to light. Eserine producing no improvement an iridectomy was undertaken, but on completion of the corneal section signs of intraocular hæmorrhage became apparent and the contents of the globe were expelled.

CASE II.—An hotel servant, aged 58, had lost the right eye from an accident as a boy. For a year the left eye had been failing, with occasional attacks of darkness in which the patient was unable to find his way about. On examination there was found a deeply-cupped and pale disc, some stippling of the cornea, pupil 6 mm., acting very slightly, T. $+ 1$ to $+ 2$, considerable contraction of the

field of vision. Under eserine the tension fell to $+ \frac{1}{2}$, and the field enlarged to 35° up, 25° in, 10° down, 55° out.

On October 19, 1899, the left superior cervical ganglion was removed. The pupil contracted to 2 mm. and the tension fell to normal at the conclusion of the operation. October 20: T. decidedly below normal. October 23: T. $-\frac{1}{2}$. Later the tension became normal, the field gradually enlarged to 50° up, 45° in, 30° down, 75° out, and vision improved to about $\frac{5}{7}$. He returned to his employment, and on January 18, 1900, the satisfactory condition was maintained.

CASE III.—A woman, aged 37, had been treated when aged 18 for keratitis of the right eye. During her last puerperium two years ago she suddenly began to suffer pain in the right side of the head, with loss of vision of the right eye. When seen six months after this there was complete amaurosis of the right, tension nearly $+ 1$, no inflammatory symptoms, but enlargement of the anterior ciliary veins; the disc was deeply and completely cupped. A small leucoma at the upper part of the cornea had a little pointed adhesion of the iris included in it, but otherwise the iris was free and the pupil acted fully to illumination of the other eye. The patient was never wholly free from pain, and although the use of myotics, with phenacetin internally, somewhat reduced the tension, the pain was not in any way relieved thereby. The left eye was normal.

On November 30, 1899, the right superior cervical ganglion was removed. Immediately after the operation there was myosis, with normal tension and no pain.

On the night of the sixth day after operation there was a return of pain, and next day the eye showed congestion, hazy cornea, and T. $+ 1$ to $+ 2$. The pupil remained smaller than the left. Eserine caused prompt recession of the acute symptoms, and while it was used the tension remained nearly normal and the eye free from pain.

In the case of this patient the resection of the sympathetic ganglion was followed by by-effects of an unpleasant character. There was ptosis, annoying paræsthesiæ in the right half of the scalp, feelings of heat and sweating

of the whole head on prolonged speaking, and some impairment of function in the right arm, so that she could not grasp properly when the hand was raised to the back of her head.

Summing up very briefly, we may say that these cases, so far as they go, show (1) an immediate reduction of tension and narrowing of pupil in all; (2) a marked and progressive enlargement of the field of vision, such as has not been obtained by any other method of treatment; and, unfortunately, in two out of the three cases, (3) a glaucomatous attack of inflammatory type following within a relatively short interval after the operation.

(2) It is interesting to compare these clinical observations with some experimental results in animals recorded in the same publication by Professor Langendorff, of Rostock. After showing by several experiments that the superior cervical ganglion exerts a continuous tonic influence on the dilator of the pupil—for when the ganglion is removed from one side, while the trunk of the nerve is cut below the ganglion on the other, the pupil is, as a rule, smaller on the former (the “ganglion” side) than on the latter (the “nerve” side)—he proceeds to point out that the condition just described is demonstrable only for a short time after the operation. Even after some hours the difference between the pupils begins to lessen, and after a day or more in many cases the pupil of the ganglion side has actually become wider than the other. The difference under ordinary conditions is small, but if the animal be submitted to the action of any narcotic (ether, chloroform, ethyl bromide, chloral, morphia), the pupil of the ganglion side dilates to a degree so striking and unexpected that Professor Langendorff has given to the phenomenon the name of “paradoxical dilatation of the pupil.” Although produced with the greatest certainty by narcotics, the phenomenon is also called forth by excitement, by stimulation of sensory nerves, and by dyspnœa.

The explanation of it is not at first obvious, but the author considers that it is to be found in the fact that descending degeneration occurs in the pupillary fibres of

the sympathetic when they are separated from the ganglion in the neck, which is, in fact, their trophic centre. "It is known that in the case of striped muscles the degeneration of their nerves may give rise to obvious signs of irritation; witness the 'paralytic undulations' of the tongue after section of the hypoglossal nerve, the quivering of the facial muscles in paralysis of the seventh. It does not seem unreasonable to assume that in the case of the smooth muscles with their comparatively slow mode of contraction a similar irritation may express itself as a continuous contraction or *contracture* rather than by fibrillary twitchings or undulations." So long as the sphincter iridis retains its normal innervation it outweighs the relatively feeble dilator fibres; but when this innervation is removed, by the action of narcotics or otherwise, the contracture of the radial fibres is able to make itself evident.

Although it is probable that conclusions deduced from these experiments could not be applied without modification to the case of man, they may indicate a direction in which to look for the cause of failures such as those recorded above.

W. G. L.

V

 A. v. Hippel (Halle). On the Final Results of Operation for Myopia. *v. Graefe's Arch.*, xlix., 2, p. 386.

The operative treatment of high degrees of myopia having now become a recognised mode of procedure, it is desirable, by repeated subsequent examinations of the eyes operated on, to establish the limits within which the operation appears justifiable, and how far it may be considered dangerous.

For this reason v. Hippel subjects to a detailed analysis a series of 184 eyes which have been under his observation upwards of six and a-half years, and with regard to the treatment of which he has been able to form definite conclusions.

The most important point connected with the operation for myopia is the subsequent occurrence of detachment of the retina. In the 184 cases this happened eleven times (6 per cent.), of which a detailed description is given. The author interprets these 11 cases so that in 3 the detachment had to be considered as occurring independently of the operation, in 2 it was most likely due to a thread of vitreous prolapsing into the cornea, in 4 no connection between operation and detachment could be found, while in the last 2 a spontaneous detachment in the non-operated fellow eye makes it probable that the detachment might have occurred even if the operation had not been performed.

v. Hippel points out that we have not sufficiently reliable statistics to show the frequency of retinal detachment occurring in unoperated high myopia. Examining the patients treated at the Clinique in Halle from 1884 to 1899, he finds that of nearly 70,000 patients 1,052 had myopia of, or stronger than, 10 D. (= 1.52 per cent.). Of the 1,747 myopic eyes of these 1,052 patients retinal detachment occurred spontaneously in 117 eyes (= 6.7 per cent.), while in the author's operated cases it only occurred in 4.3 per cent., and if the cases of manifestly independent occurrence of detachment are included, in altogether 6 per cent. of the operated eyes. v. Hippel is not able to give an explanation for this high percentage. That this percentage is really high will be evident if we consider that the operated cases are all young individuals. Of the above-mentioned 1,747 eyes the detachment occurred: out of 939 eyes of patients under 30 years in 37 cases (= 4 per cent.), and out of 808 eyes of patients over 30 years in 80 cases (= 9.9 per cent.).

On the other hand, the patients on whom the operation was performed in 184 eyes had retinal detachment in 11 cases out of the 184 eyes (= 6 per cent.), while the 54 non-operated eyes of these same patients had detachment in 4 instances (= 7.4 per cent.), showing an even greater percentage. If a conclusion is at all admissible of so small a number of cases, it is that the operation, if carefully performed, neither increases the risk of retinal detachment,

nor can it be considered as a safeguard against its occurrence.

Another unpleasant sequel or complication of the operative treatment is the subsequent occurrence of opacities in the pupillary region, which v. Hippel observed three times, once after the removal of the lens with the capsule. In all three cases it appeared between one and a-half and two years after the operation, and only affected the anterior part of the vitreous. The simultaneous occurrence of a macular choroiditis leads the author to attribute it to a subacute inflammatory process of the uveal tract.

Secondary glaucoma occurs very rarely. The author saw it twice only, once due to cortical masses, in the other case probably due to the operation for capsular opacities.

The danger from this latter source may be avoided by a suitable method of operation. v. Hippel has now given up the method of needling altogether and exclusively employs the *pince-ciseaux*, which he introduces through a small linear wound in the corneo-scleral margin.

With regard to the ultimate results obtained the author is well satisfied, considering that in 41.5 per cent. of his cases numerous choroiditic patches were present, and in most instances diffuse atrophy of the pigment epithelium and affections of the choroideal vessels were noticeable.

The full maximum of the visual improvement is only reached about one year after the operation. This gradual increase of vision is very marked and cannot be due solely to the alteration of the optical state, but must be attributed to an improved condition of the retinal function; but it is noteworthy that the retina is in a state very similar to nightblindness, with enfeebled adaptation and marked torpor.

A repeated examination of the dioptric condition showed no increase of the refraction after operation beyond 1 D., even in cases that have been under careful observation for several years, thus justifying Fukala's hopes of bringing to a standstill the deleterious progressive tendency of high myopia.

On the other hand, the operation is by no means harm-

less. Neither can infection be always avoided, even with the most careful aseptic precautions; nor is the danger of a loss of vitreous to be underrated, especially in restless patients. The operation is therefore only justifiable in those patients who have become unfit for work and cannot bear the correcting concave glasses. On no account ought it to be performed in the medium and lower degrees of simple myopia.

As for the mode of operation:—In patients under 30 years of age, the author makes a large dissection with subsequent linear extraction without iridectomy. After 30 years of age the transparent lens is removed by a flap without iridectomy. In restless patients cocaine is supported by chloroform narcosis.

If, however, the author lays much stress on the chloroform narcosis as preventing the prolapse of vitreous in all his cases, it must not be forgotten that chloroform is a double-edged weapon on account of its not unfrequent sequel of retching.

K. G.

MORGANO (Catania). Subconjunctival Injection of Anticeltin. *Rassegna Internazionale della Medicina Moderna*, i., 1900.

At first great things were hoped for after the introduction of the system of local antiseptics by means of subconjunctival injection of corrosive sublimate in various affections of the eye, but further experience has rather discouraged surgeons from its employment. The reasons for this, besides certain theoretical objections, are three, viz.: the really intense pain following such injection and lasting for several hours; the violence of the reaction produced, accompanied by chemosis and severe conjunctivitis, the inflammation causing also great œdema of the lid and cheek, and of the circum-orbital tissues generally; and, lastly, the changes which take place at the point of injection—cicatricial condensation of tissue, adhesive inflam-

mation, and occasionally even sloughing of portions of the conjunctiva and superficial layers of the sclerotic. In rabbits, though not so far as the writer knows in the human subject, this condensation of tissue has led to a blocking of the exit routes at the angle of the anterior chamber and consequent glaucoma; this, however, has only happened when an unduly concentrated solution has been employed. It became a question further, considering the necessarily great dilution of the drug, and the minute quantity which could possibly be injected, whether the corrosive sublimate had any virtue at all, and some believed that they had been able to obtain results just as satisfactory by employing chloride of sodium in place of the mercury salt; that, in fact, any benefit which followed the injection was to be ascribed to the quickening of the lymphatic current and the improved activity of the circulation in the district that resulted from the mere subconjunctival introduction of a fluid. In certain cases solutions of other substances, especially chloride of sodium, seemed to answer just as well, but in syphilitic lesions, at any rate, this is certainly not so, and against them injections of common salt in solution have no power. Most observers, too, are agreed that the salts of quinine, salicylate of soda, &c., are all inferior to salts of mercury.

In presence of these facts it seemed desirable to Morgano, working under the supervision of Professors Francaviglia and Capparelli, to endeavour to find some combination of mercury with which to pursue this method of treatment, which should possess the four qualifications of not coagulating albumin, not causing pain, not setting up inflammation, and not forming chemical or other injurious combinations with the tissues. He believes he has found this in the substance known as Anticeltin, a combination of mercury with urea, in which the metal accounts for 43·4 per cent. He has found that in the rabbit injection of half a syringe of a 1 in 1000 solution of anticeltin was well tolerated, and in no case out of many was there any inflammation of tissue or other injurious effect upon the parts involved. His next step was to

discover whether this compound had any therapeutic value, for which purpose he induced suppurative keratitis in rabbits by "vaccinating" the cornea with the secretion from the lacrymal sac of a patient suffering from dacryocystitis. He has not as yet been able to produce experimentally a sufficiently large number of keratitis cases, and then to cure them, for his results to be very convincing, it must be confessed; while it is evident that solutions of anticeltin materially stronger than those which he generally used are open to the same objections as are those of corrosive sublimate.

Clinically, also, the number of cases in which he has been able to apply the treatment have not as yet been sufficient to warrant an unbiassed opinion, but he claims successes in several instances of various forms of corneal inflammation. In the human subject he employed a solution of either 0.75 or 0.50 to 1000, and injected one-third of a syringe of the stronger solution, or in more severe cases one-half of a syringe of the weaker concentration. He advises that the solution should always be warm when used, and that lukewarm fomentations should be applied to the eye for half an hour or so after injection. With these precautions he has only observed pain on two occasions, and even in these two it was both slight and transitory.

W. G. S.

A. PECHIN. Ocular Tuberculosis. *Gazette hebdomadaire de Médecine et de Chirurgie*, January 28, 1900.

The chief part of this article is taken up with a *résumé* of the present state of our knowledge of the subject of tuberculosis of the iris and ciliary body, which dates, one may say, from 1868, when Gradenigo published his case and the diagnosis was confirmed by microscopical examination.

Tuberculosis of the iris is most frequently met with between the ages of 5 and 25; it has, however, been

observed even beyond that limit. The precise mode of its occurrence has been much discussed; one view is that a local inoculation takes place in a healthy subject by way of an abrasion of the conjunctiva. Another, that the initial lesion is a tuberculous ulcer of the conjunctiva; another, that a sharp foreign body abrades the conjunctiva, the spot then becoming infected. Mitvalsky of Prague suggests that if the respiratory mucous membrane can be infected by the tubercle bacillus after a simple catarrh and a mere *dérangement* of epithelium, so may the conjunctiva even though it may not have previously suffered a loss of substance. Secondary infection is, however, much more frequent than primary, and the patients are found among those suffering from the chronic pulmonary, osseous and cutaneous forms much more than among those with rapid general tuberculosis. In the uveal tract the nodules may be either miliary and disseminated, as in tubercular meningitis, or in a circumscribed small mass in iris or ciliary body; in the latter the prognosis, according to the author, is less grave than in the former; in this opinion he is at variance with certain authors of repute. In irido-cyclitis small grey nodules, sometimes translucent in aspect, appear on the iris only to disappear again, or undergo changes which terminate in healing, or gradually their development leads to destruction of the anterior segment of the globe. It is not always very easy to distinguish between this condition and tumour, since inflammatory alterations may be entirely absent. These nodules are of a grey or pinkish grey colour, and may be entirely free from injection. A slow painless iritis or irido-cyclitis occurs, either plastic or serous, generally there are deposits on Descemet's membrane, and unless for some reason arrest of the process occurs, the end is phthisis bulbi. Besides this attenuated form there is a more acute suppurative variety in which the nodules, instead of becoming absorbed, enlarge and extend into the anterior chamber, perforate the globe, and appear externally in the form of a fungating mass. Other forms have been described, in which the chief feature is an increase of

tension, or in which deposits on Descemet's membrane with cataract formation form the principal characteristic, but those detailed above are the most important.

Diagnosis may be simple enough in some cases, but in others it is not easy. Syphilitic nodules are rarely so numerous as tubercular, though sometimes they are multiple; in such a difficulty the diathesis of the patient as indicated by a number of different general conditions is of much importance. Under the name of *granulie* of the iris, de Wecker describes certain small growths which he has seen on the iris of children; these formations are accompanied by symptoms first of serous, then of plastic iritis, and then of glaucoma. In order to avoid altogether committing himself by attributing the condition either to the one diathesis or to the other, he has suggested the above name—though he himself believes the condition to be of hereditary syphilitic origin—for a tubercular tendency cannot always be excluded in such patients. A sarcoma, with which a tubercular nodule may in its early stages be confused, is but rarely accompanied by any iritis, and it usually contains more vessels than either a syphilitic or a tubercular lesion; besides these points, a sarcoma is sure to be solitary. In a case in which perforation has occurred the mass should be examined for small yellow spots, which are never seen on the surface of a sarcoma. It is very rarely that there arises any difficulty of diagnosis further than those indicated, but the possibility of leprosy should not be forgotten.

Great caution must be exercised as regards operative interference, and enucleation should only be performed in exceptional cases, as when there is an acute process with glaucomatous attacks, and with a fungating mass perforating the globe. Péchin believes that iridectomy is useful in the case of solitary tubercle with preservation of good perception of light.

C. H. U.

EYRE. Tuberculosis of the Conjunctiva. *Archives of Ophthalmology*, N. Y. January, 1900.

REIMAR. Two Cases of Tuberculosis of the Conjunctiva. *Klinische Monatsblätter für Augenheilkunde*. February, 1900.

VIEUSSE. Contribution to the Study of Tuberculosis of the Conjunctiva. *Recueil d'Ophtalmologie*. January, 1900.

In these three papers we have altogether eight new cases of tuberculosis of the conjunctiva recorded. Eyre, who adds three new cases to the eight already published by him,¹ recapitulates Sattler's classification with slight modifications, and opposite to each group places a note of its microscopical peculiarities. The disease occurs either as a caseating ulcer or as an inflammatory new formation of the granuloma type; if the latter, it belongs to one or other of four clinically distinct groups; it is exceptional to detect tubercle bacilli in sections of the tissues from these, but they can usually be found in the "scrapings" from ulcers. Well defined giant cell systems are found only in some of the groups.

Vieusse recognises three clinical forms:—(1) an ulcer with sharply cut, irregular margin, yellow base, and surrounded by an infiltrated zone; (2) a diffuse form presenting small elevations of the mucous membrane which are frequently ulcerated; (3) a rare polypoid form.

The etiology of the affection is discussed by Reimar and Vieusse; the former considers that the conjunctiva in both his cases was infected directly from without. The nasal mucous membrane was not affected, and there was no disease of other organs. The contraction of the tear passage in his second case might have been secondary. In his view it is quite conceivable that the tubercle bacillus may be conveyed into the nose from disintegrating pieces of conjunctiva, and there cause infection of the nasal mucous membrane as well as in the nasal duct.

Vieusse referring to the view, arising from Audry's work, that lupus of the face is the result of propagation of

¹ *Transactions of the Ophthalmological Society*, 1897.

tubercular ulcers from the nasal fossæ, holds that these same ulcers may spread to the conjunctiva by the nasal duct, and he thinks it conceivable that in some such cases the lachrymal passage may escape infection. It is certain that a number of cases of conjunctival tuberculosis are the result of tubercular ulcers arising in the nasal fossæ, but whether they result from the migration of the bacillus of Koch, or from the spread of the nasal ulcer, is difficult to settle.

The local lymph glands are not always swollen. Reimar found no swelling of the pre-auricular or submaxillary glands in his second case, and suggests the possibility in such cases of the swelling having subsided. He considers that Eyre's conclusion, "The pre-auricular gland of the same side as the affected eye is infected early, and then the next glands in the series, viz., those below the angle of the jaw," is too generalised, and liable to give rise to error in differential diagnosis, since the swelling of the local lymph glands is not always demonstrable in tubercular conjunctivitis. Objection is also made to the statement that conjunctival tuberculosis exhibits no tendency to undergo spontaneous cure, on the ground that it is too absolute; Reimar looks upon his own first case as one of spontaneous cure although iodoform was used, and refers to Fuch's statement that conjunctival tuberculosis in exceptional cases may heal spontaneously, and also to cases communicated by Brettauer and Horner, in which healing resulted after treatment with iodoform.

Both Vieusse and Eyre advocate thorough removal of the diseased part; but Reimar recommends the local use of antibacterial substances and actual excision only in specially favourable cases, and by means of the thermocautery instead of by "blutiger" methods, especially scraping, which may facilitate the entrance of bacilli into the opened tissue spaces and so cause fresh disease. Tuberculous treatment tried in his second case produced no improvement. The proportion of cases of tuberculosis of the conjunctiva (1 in 2,700) found by Eyre, will probably appear to most ophthalmologists to be too large.

C. H. U.

DAVIS (New York). *The Refraction of the Eye.*
Macmillan & Co., Ltd., London.

If Dr. Davis had called his book "The Use and Value of the Ophthalmometer," or by some similar title, no one would be misled as to its scope or have any reason to complain, but he has named it "The Refraction of the Eye." As a treatise on this subject it is without most of the necessary elements; there is no definition or description of the various conditions of refraction, and acquaintance with the nature of the different abnormalities is simply assumed to exist. It is true that in the preface he states that the book was written for the purpose of demonstrating the clinical and practical use of the ophthalmometer, but this fact hardly excuses the employment of a title so deceptive. So far as ophthalmometry goes, Dr. Davis's is likely to prove a useful and fairly reliable guide to the employment of a valuable instrument, but the ophthalmometer is only one of many, and is not necessarily the best means of estimating certain of the abnormalities of refraction. While the description of the method of employing subjective tests with lenses is somewhat meagre, yet in the course of it, and elsewhere, the reader will find a number of really useful hints on minor points, scattered here and there without method. The best part of the book from the point of view of the inexperienced reader for whom it is written, is the collection of typical cases, in which Davis tells the patient's symptoms, amount of vision, reaction to lenses, correction by ophthalmometer, &c., and then explains what treatment was actually adopted. A puzzled junior may find here a helping hand in a troublesome case. It behoves a purist to be accurate himself; the author invents the expression Antimetropia, for anisometropia does not satisfy his ideas of precision, yet he is guilty of the phrase "myopic cylindrical lens," and of numerous instances of bad grammar; Dr. Davis strains at the gnat but swallows the camel.

If he will alter the name in the second edition we shall

be better able to praise his little book, which, as has been stated, has commendable qualities in the limited area which it covers.

THERAPEUTIC NOTES.

CASSARIPE.—Throughout tropical America and the West Indies the manioc, *Manihot utilisissima*, or bitter cassava, grows abundantly, and from the grated root, after expression and careful washing have removed the poisonous juice, tapioca or Brazilian arrowroot is prepared. It is this poisonous juice which is employed, after boiling has destroyed its injurious properties, in the manufacture of the famous West Indian pepper-pot, called also cassaripe. It has valuable qualities as a preservative, and meat to which it has been added will keep sweet for a considerable time, even in tropical climes. Chandler, of Boston, U.S., suggested to Risley to use it in eye work, which he has done in the form of a 10 per cent. ointment. He regards it as a valuable vegetable antiseptic, non-irritating, and acting well even in ophthalmia neonatorum.—*Transactions of American Ophthalmological Society*, 1898.

SUBCONJUNCTIVAL INJECTIONS.—Under the guidance of Prof. Leber, Addario (Catania) has conducted careful investigations with the view of discovering the extent to which a solution injected under the conjunctiva can find its way into the anterior chamber, and the rapidity with which this takes place. Three chief points are involved in the investigation, viz., the time taken for the process to begin and to reach its maximum, the effect of greater or less concentration of the solution, and the precise site of the injection. Briefly put, his results are the following: The soluble substance (he used both ferrocyanide and iodide of potassium) may be demonstrated in the aqueous humour in from five to ten minutes; the quantity reaches its maximum in about an hour, but may still be found after from two to three hours. The quantity of the salt which reaches the anterior chamber diminishes with the

concentration of the solution. The differences in time and quantity between injections made close to the corneal margin and those made at the equator of the globe were but trifling. In the case of bichloride of mercury, the chemical recognition and quantitative estimation of which are extremely difficult, he was able to show that the amount which reaches the anterior chamber cannot, when mixed with the aqueous humour, form a solution of greater strength than 1 to 100,000—a concentration whose antiseptic power is of course *nil*.—*von Graefe's Archiv für Ophthalmologie*, xlviii., 2, 1899.

HOW TO EMPLOY SUBCONJUNCTIVAL INJECTIONS WITHOUT PAIN.—It is probable that in spite of the difficulty of arriving at a satisfactory explanation of the mode of action of corrosive sublimate when injected under the conjunctiva, its employment would be much extended could this be done painlessly; without an anæsthetic all subconjunctival injections are attended with considerable pain. Cocaine does not mix with corrosive sublimate, so Darier prefers to employ cyanide with the cocaine, but though the actual injection causes no discomfort, rather severe smarting comes on in about fifteen to thirty minutes and lasts a considerable time. It is necessary, then, to find an anæsthetic whose action will be more prolonged, and he believes he has found this in acoin. The stronger solutions of acoin are somewhat irritating, and at first he concluded that his experiments failed to show any advantage whatever of acoin over cocaine, but by combining in one application both cocaine and acoin, so that he obtained both immediate and prolonged anæsthesia, he was better satisfied than with either drug separately. Acoin is a white crystalline powder, soluble in water to 6 per cent., such solutions being strongly antiseptic. Unfortunately a number of substances precipitate acoin, such as iodides and corrosive sublimate, but it agrees with cyanide of potassium. The chemical name of acoin is somewhat alarming, viz., diparaanisylmonophenethylguanidinchlorhydrate!

Randolph, Baltimore, has also made use of acoin for removal of foreign bodies from the cornea, clearing out of

tarsal cysts, &c., but does not seem to consider that it can replace cocaine. It appears that it has, like cocaine, but little action comparatively when the eye is congested, but it has the advantages that it does not dilate the pupil, nor affect the tension, nor weaken accommodation; and it is to some extent antiseptic. Unfortunately a considerable feeling of stinging and burning follows its instillation.—*La Clinique Ophthalmologique*, Paris, June 25, 1899, and *Ophthalmic Record*, Chicago, August, 1899.

TREATMENT OF CHRONIC INFLAMMATION OF THE LIDS.—When inflammation of the lids has been very persistent, recurrent and long continued, the whole substance of the lid is apt to become much thickened and to resist ordinary applications even more obstinately than when the blepharitis was in its acuter stages. To remedy this condition Kugel (Bucharest) proposes an operation which consists in laying bare the anterior surface of the tarsal cartilage and simply shaving off its anterior face, so that instead of its being two or even three times as thick as it ought to be in the normal condition, it regains its proper size; this is readily enough done with a Beer's knife. If the hair-bulbs have not been too much destroyed by previous inflammation, it is worth while to take pains to avoid injuring or removing them. With the results of this simple procedure Kugel expresses himself as much pleased.—*v. Graefe's Archiv für Ophthalmologie*, xlviii., 2, 1899.

PERONIN, A NEW LOCAL ANÆSTHETIC.—Hydrochlorate of peronin (Merck's peronin) is a white powder with a bitter taste but no odour, feebly soluble in cold water but dissolving up to 2 per cent. in hot; insoluble in absolute alcohol, ether, and chloroform; used internally it has been found to be of service in the cough of phthisis, in whooping-cough, neuralgia, &c., and more particularly as a hypnotic among neuropathic and alcoholic patients. Some seem to think that in suitable cases it is more efficient than morphia. Bufalini reports that when two or three drops of a tepid solution of 1 to 2 per cent. of peronin are dropped into the conjunctival sac, anæsthesia of the cornea both complete and profound occurs almost immediately; the cornea can be touched with a needle, and even stimulated

with acetic acid on a glass rod, without the animal experimented upon evincing any uneasiness whatever and without reflex closure of the lids. This anæsthesia is peculiar in two particulars, in that it occurs almost instantaneously and lasts a long time; after the instillation of two or three drops the cornea is insensitive for many hours. Opacity of the cornea is not apparently any more likely to be present after peronin than after cocain, and hyperæmia is not produced by it in rabbits at all events. Guaita has attempted its employment in the human eye, making use, in the first instance, of a solution so weak as $\frac{1}{2}$ per cent. only. At the moment of instillation there is set up a feeling of rather sharp smarting, but after a few seconds this becomes mitigated and in one minute is gone; hyperæmia of the conjunctiva occurs at the same time, reaching its maximum in about four minutes, and not finally disappearing for a couple of hours or more. There is at the same time smart lachrymation and running at the nose, and even a little watering of the fellow eye; the accompanying œdema does not altogether disappear for several hours. The anæsthesia produced by a 1 per cent. solution is as great as by 3 per cent. cocain, and there is no risk of desquamation of the epithelium; peronin has no effect upon the pupil, accommodation, visual acuity, field of vision or tension. The chief operations in which we may find peronin most useful are, he thinks, enucleation and evisceration, for here cocain acts too feebly; in these operations conjunctival hyperæmia matters little, and the depth of tissue which can be rendered anæsthetic by means of peronin is much greater than is the case with cocain.—*Annali di Ottalmologia*, vi., 1899.

✓ SUPRA-RENAL EXTRACT.—The vessel-constricting action of supra-renal extract is, according to H. Landolt, strictly confined to the superficial vessels, and in this way may prove of value in assisting to decide whether a certain injection of the globe is altogether superficial or partly affects the deeper structures. If the whole of the injection disappears, then the hyperæmia must have been purely superficial; while deeper structures are involved, their characteristic hyperæmia will be manifested. He con-

siders that this power of inducing long-continued anæmia of an injected area may render the extract a valuable cosmetic for those whose eyes may happen to be "red." The first sensation on introduction into the conjunctival sac is one of slight burning and heat, but this very soon gives place to an agreeable feeling of coolness, while the mental effect upon the patient who sees his inflamed eye become pale and natural looking, is very marked. Instilled into the conjunctival sac, supra-renal extract has no influence on tension or accommodation, and the retinal and choroidal vessels are unaffected, but in rabbits, at all events, this does not hold good when the substance is injected subconjunctivally, for then it acts as a mydriatic.

He has not been able to employ it thus in the human subject, for local necrosis, or actual death even, is apt to occur if any but a very small dose is employed, and until something is known as to the quantity which it may be safe to use, no investigation can well be attempted. But at all events in the animals in which he was able to employ subconjunctival injection of supra-renal extract, no constricting effect upon the vessels of the fundus was observable, nor alteration of the tension. The chief utility of the preparation lies in its ability to render an operation almost bloodless, and to intensify the action of atropin, cocain, eserine, &c. Thus it is of great value when an iridectomy is to be performed during the "inflammatory" stage of an acute glaucoma, for not only is the area of operation made anæmic, but the anæsthetic influence of the cocain, notoriously small in such cases, is greatly increased.—*Centralblatt für Augenheilkunde*, Nov., 1899.

ARGENTAMIN.—Imre states that for the last few years he has substituted argentamin in place of nitrate of silver in the treatment of inflammations of the conjunctiva; even in 5 per cent. solution no grey coloration of the surface of the eye follows its application, so that it seems as though it does not act as the other silver compounds in general use by precipitating albumen; in such concentration it produces no pain. Provided the solution is not quite cold it causes no reddening of the eye when painted on; some few of the patients said there was a slight burning sen-

sation, but the most admitted that there was no pain connected with its application. It is not necessary to wash the eye after application in order to remove excess of the material, on the contrary it is good practice to wipe the parts carefully and reapply the moistened brush; unfortunately it stains fingers, linen, &c. As an application in trachoma it is not less efficient than nitrate of silver, and causes less pain. In acute catarrhal conjunctivitis it acts well; in purulent ophthalmia it does good, causes little reaction, and for this reason it is more serviceable than silver nitrate, since it can be applied several times a day. He quotes with approval the opinion of Schäffer that the superior antiseptic properties of argentamin are due to its alkalinity; he says that the silver phosphate, which in union with ethylendiamin, forms argentamin, is "conducted" into the tissues by the ethylendiamin and there destroys the bacteria by entering into chemical composition with their substance.—*Ungarische Beiträge zur Augenheilkunde*, Vienna, ii., 1900.

DIONIN, as the hydrochlorate of ethyl-morphine has been named, is a crystalline powder readily soluble in water, which appears to have considerable power to stimulate the lymph circulation in conjunctiva and cornea. Applied to the conjunctival sac, it produces not merely anæsthesia of the conjunctiva and cornea, but in about a quarter of an hour there is marked chemosis, and a distinct increase in the activity of the nutrition of both. Wolffberg has utilised this quality in cases of corneal ulcer with low vitality and threatened perforation with very satisfactory result. He employed it also in the case of a very old woman whose cornea fell in in folds on extraction of a hyper-mature cataract, so poor was its nourishment; within a few minutes after the application of dionin powder the cornea resumed its normal position and bright appearance. Both Wolffberg and Nicolaier regard dionin as valuable in most forms of corneal inflammation, but useless in trachoma. After cataract extraction Wolffberg is accustomed to introduce dionin into the conjunctival sac daily for three days: he believes this to be very effective in ensuring sound healing.

It has been objected against dionin that it is apt to cause violent sneezing, which would of course be very dangerous where there is a large wound of the globe, but Wolffberg says that if properly introduced on a vulcanite spoon and not by insufflation it has no such tendency; in 600 patients he has never met with the accident. Nor does he agree that it is apt to cause hæmorrhage, and so far from being a painful application as stated by some, he repeatedly has found it beneficial in relieving discomfort. Where a very rapid action is desired, as after extraction of cataract, the powder itself may be used, but in corneal inflammation it is best made up with cacao-butter (25 per cent.). It has also been found beneficial in glaucoma, reducing the tension, relieving pain and causing the cornea to clear up. —*Deutsche Medizinal Zeitung*, xcv., 1899, and *Wochenschrift für Therapie und Hygiene des Auges*, April 5, 1900.

BELGIAN OPHTHALMOLOGICAL SOCIETY.

Recueil d'Ophtalmologie, February, 1900.

Sarcoma of the Orbit.—Dr. van der Stræten showed a young woman of 22, in whose left orbit the tumour had begun to grow five years previously; exenteration had not prevented recurrence, and now the growth was of enormous dimensions. It had crossed the middle line so that there was right exophthalmos, and it reached from the hairy scalp to the lower jaw, and outwards as far as the ear; the mouth and teeth were much deformed. Her general state of health, considering all things, was wonderfully good.

Encephalocoele of the Orbit.—Dr. Coppez exhibited a patient who had also been shown to the Society in 1897 by van Duyse and Moyart, who had at that time removed from the orbit a cystic sac, leaving untouched a second sac the size of a pea, which was situated at the anterior internal angle of the orbit. The fluid contained had the characters of cerebro-spinal fluid. This second little tumour increased in size, and on removal was found to be a whitish semi-solid mass, only slightly adherent to neighbouring parts.

Tuberculosis of the Iris.—Dr. Gallemaerts showed a girl of 18, whose parents had both died of consumption. Six months before, first the left eye, and then, but less severely, the right had suffered from kerato-iritis. Amenorrhœa had been present at the same time, but on reappearance of the menses the eye condition had cleared up. Later, double papillitis had occurred and atrophic

rhinitis, and lastly two small grayish-brown nodules had developed in the lower part of the left iris ; these were of a velvety appearance, non-vascular, and projected somewhat into the anterior chamber. There were deposits on Descemet's membrane, and optic neuritis was still manifest.

Optic Neuritis and Sphenoidal Sinusitis.—Drs. Coppez and Lor join issue with de Lapersonne in regard to the prognosis in this affection. They do not consider it so bad as he does, and relate a case which they watched from the beginning, and in which they obtained a good result.

Sympathetic Neuro-retinitis.—M. Vennemann. In his experiments on animals in regard to sympathetic ophthalmia Deutschmann was able to cause neuritis, but neuritis as a pure condition does not occur in man as a symptom of ophthalmia migratoria. The case which the author reports is one in which, without traumatism, the left eye was lost by acute panophthalmitis following a purulent ulcer of the cornea. Subsequently the right eye developed neuritis, with pains in the forehead and ear ; vision was reduced to counting fingers at a few metres ; throughout all, however, there was no affection whatever of the vascular coat of the eye. The author thinks that organisms had passed from the inflamed eye into the nerve sheath and so up to the chiasma, causing the frontal headache, and so down the other sheath to the cul-de-sac, this direction being forced upon them by the centrifugal action induced by the frequent rotatory movements of the head (!) Since the escape of the pus from the first eye the current had turned again, and though no special treatment was used the papillitis has ceased.

Phlyctenular Conjunctivitis and Adenoids.—Dr. Benoit has been able to cure very intractable phlyctenules by the application of an antiseptic ointment to the nasal mucous membrane ; he now makes a point of examining the nasal membrane in all such cases.

Ocular Manifestations of Lead Poisoning.—Dr. de Lantsheere-Blyckaerts considers that lead is more frequently to blame for eye disease than is commonly supposed. He gives notes of certain cases in which he thinks lead poisoning played an important part. Two of the cases were of asthenopia in patients who presented characteristic evidences of lead ; one, a case of conjunctival irritation and albuminuria ; one, a case of retinitis ; another, of double optic atrophy, and so on.

Pseudo-actinomycosis of the Lachrymal Canal.—Dr. van Stræten related the case of a lady of 60, who had a small growth at the inner angle of the upper eyelid, pressure on which caused pus to escape from the canaliculus, but there was no stricture. He laid open the mass, and found a considerable amount of semi-solid yellowish material lying in the incision and lining the canaliculi, to the walls of which it was adherent ; this material closely resembled actinomyces under the microscope.

Hyaloid artery.—Dr. van Duyse described and discussed a case in which there were marked remains of this structure.

HEREDITARY OPTIC ATROPHY IN THREE BROTHERS EXPOSED TO LEAD POISONING.

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THE cases I report here are interesting as showing the influence of lead as a possible exciting cause in a family liable to optic atrophy. The influence of tobacco, alcohol, and other substances, has been frequently discussed as a determining cause in these cases, and no one of these causes is wholly absent in the cases I report. But as the balance of evidence points to lead as the determining factor, I think they are sufficiently exceptional to be worth reporting.

George French, a plumber, aged 27, attended at Moorfields in August, 1896, under Mr. Nettleship, to whom I am indebted for the notes of his case. The sight of both eyes had been failing for one month. He had smoked 2 ozs. of shag a week for the last four or five years.

V. R. < $\frac{6}{60}$; counts fingers ; and J. 16.

V. L. < $\frac{6}{60}$; counts fingers ; and J. 20.

The fundi and media on his first attendance are noted as normal.

December, 1896, the fundi are noted : O. D.'s pale all over, veins rather tortuous, arteries rather small. His vision had not improved, though he had not smoked at all since coming to the hospital, and had left off his occupation. He had no lead symptoms, and no

constipation. His knee-jerks were present, and he showed no evidence of any constitutional disease. His fields were slightly constricted on the temporal side, and he had a central scotoma for green and red.

William French, plumber, aged 22, attended at the Western Ophthalmic Hospital in January, 1897. His sight had failed rather suddenly a few weeks previously. His general health was good, and he showed no evidences of lead poisoning.

V. R. $< \frac{1}{60}$ and J. 20.

V. L. $= \frac{1}{60}$ and J. 20.

His fields were practically full; he could not recognise red, yellow, or green, in any part of his fields. He may have had a central scotoma, but, if so, it involved the whole of his field. Blue, he appeared to recognise clearly. Fundus examination: both O. D.'s were pale and atrophic, and I was inclined to regard them as the result of primary atrophy. I saw him last in March, 1899; his vision was about the same, his peripheral vision appearing much better than his central vision. Fundus examination: the atrophy slightly more advanced.

I sent him to see Dr. Leonard Guthrie, who reported that he could find no indication of cerebral or other disease about him, and no evidence of lead poisoning.

At the same time as I saw William French, I saw his brother, George, who was attending at Moorfields under Mr. Nettleship, who very kindly gave me his notes of the case, and passed him on to my care.

I also got his second brother, Robert, who was two years older than himself, to attend at the hospital. I carefully examined him in February, 1897. He had a slight degree of hypermetropia.

V. R. and L. $= \frac{6}{6}$ c. + 1.5 = $\frac{6}{5}$.

On examination of the fundus, the margins of his O. D.'s were somewhat blurred, but I considered them well within normal limits. In January, 1900, he

(Robert) came complaining that his sight had failed rapidly during the last fourteen days, and on examination I found that he had well-marked optic neuritis in both eyes. R. O. D. margins very blurred, indistinguishable except at the temporal side; no great engorgement of vessels; only slight swelling, not more than + 1 D.; no hæmorrhages.

L. O. D. margins completely hidden; smaller vessels engorged and tortuous; swelling about + 2 D.; well-marked striated hæmorrhage below O. D., and a few fine linear streaks of hæmorrhage. The neuritis was most marked in his right eye; the left was probably subsiding.

On *January* 8.—V. R. = $\frac{1}{60}$ and J. 19; L. $\frac{6}{12}$ c. + 1.5 and J. 4.

On *January* 18.—V. R. = $\frac{1}{60}$; L. = $\frac{6}{36}$.

On *February* 5.—V. L. = $\frac{1}{60}$.

The neuritis rapidly subsided, and the hæmorrhage absorbed. His colour sense was tested on *January* 15, and he was then unable to distinguish any colours with his right eye, while with his left he occasionally recognised colours in small portions of his field. His answers were uncertain, and if there was a central scotoma, it was not a well-defined one.

I sent him to see Dr. Risien Russell, who kindly wrote to me as follows:—(*January* 17) “I went carefully into the patient’s case, and could find no evidence of intra-cranial disease to account for the optic neuritis. On the other hand, the man has worked in lead for seven years, and has a suspicious-looking line on the gums of the upper jaw, though the lower is peculiarly free from any trace of this. There is no sign of lead paralysis, and there is no history of colic. I am inclined to regard the optic neuritis as due to lead, though it is possible that the family tendency to vulnerability of the optic nerves has allowed of their falling victims to the poison. Lead cannot be excluded

in the man's brothers, in that they both worked in lead before their sight became affected, and in that, in some cases, the lead leads to atrophy without preceding neuritis of the optic nerves. One of the patients only worked in lead for two years, so that it certainly looks as if there was a family tendency to vulnerability of the optic nerves."

As regards the family history, there is nothing very definite. The father and mother are both living and see well. One brother of the father had weak sight from a "sprained ankle," which got no better. The child of another brother is an idiot and was born blind. The family consists of ten children.

(1) Sister, age 33, sees well.

(2) George, age 30, sight failed at 27 ; plumber.

(3) James, age 29 (?), sees well ; gas-fitter.

(4) Robert, age 27, sight failed at 27 ; plumber.

(5) William, age 25, sight failed at 22 ; plumber.

Two younger brothers and three sisters all see well.

The occurrence of optic neuritis and subsequent atrophy in these three brothers raises various interesting questions. The question of heredity appears to be beyond dispute ; but whether it is an hereditary tendency to optic atrophy, or an hereditary susceptibility to lead poisoning, or a combination of the two, is doubtful.

As regards the question of lead poisoning, the chief fact in favour of this is that all three brothers were plumbers. None of them had any other symptoms of lead poisoning, except the one who had a doubtful blue line on the upper gums only. Otherwise, they were all strong, healthy men, with no evidence of lead poisoning either before or since. Out of the six brothers, the three who were engaged in the plumbing-trade were affected, and so far no other members of the family have developed optic neuritis. The two younger brothers, however, have not yet reached the age at

which the others developed neuritis. The second brother is said to see well, although engaged in gas-fitting, an occupation not wholly devoid of lead.

The occurrence of an acute neuritis, such as was noted in Robert, is certainly unusual in cases of hereditary optic atrophy. In the two other brothers, the neuritis, if it occurred, must have been slight.

As regards the fields, in the cases of George and William there was only slight general constriction; but in the third brother, the eye with the more severe neuritis was irregularly constricted.

None of the cases have shown any tendency towards recovery under treatment, thereby resembling more nearly the hereditary than the toxic cases.

On the whole, I am in favour of considering them primarily cases of hereditary optic atrophy (Leber's disease) with lead as the exciting cause.

REVIEWS.

P. HORMUTH (Heidelberg) *Hereditary Affections of Optic Nerves. Inaug. Dissert. Heidelberg. Beitrage zur Augenheilkunde, Heft 42.*

Our knowledge of these affections dates from Leber's paper in von Graefe's Archives in 1871, based upon 15 cases in four families, and 3 cases in a single family previously recorded by von Graefe. In Leber's article in Graefe-Saemisch's Handbook the number of cases recorded had risen to 55 in sixteen families. This appeared in 1877. Since that time many cases have been published, and the number dealt with in Hormuth's monograph amounts to 284 in sixty-five families, but only 110 of these have been personally investigated by the different observers. In

addition Hormuth reports 13 new cases in nine families observed by Leber.

The clinical history of these cases is well known since Leber's article in the German Handbook. Several members of a family previously healthy lose their sight usually about the time of puberty, the lesion being commonly a central scotoma with a normal field peripherally, and after a short period of increase the lesion remains stationary.

Ophthalmoscopically, at first slight signs of neuritis are seen, which soon give place to those of more or less complete atrophy. Males are almost exclusively affected, but the disease reappears in the male children of females who themselves escape.

Hormuth gives a very complete account of the published cases, which takes up more than 140 pages of his monograph, and at the end of it we find nothing essentially new added to the knowledge we had acquired from Leber. As stated by him, most of the attacks occur about the age of puberty, but a second period of greater liability is found between the ages of 41 and 49. This second period is that in which the female cases are most likely to occur. Among twenty-nine women about a quarter were attacked at this age, indicating some relation to the climacteric epoch. The disease may occur as early as the sixth or as late as the fifty-second or sixty-seventh year.

As regards etiology we are able to say but little since no *post-mortem* examinations are on record. Graefe suggested hereditary predisposition to congestive changes. Mooren supposed a latent arteritis of the retinal vessels, and Despagne a latent meningitis. Koenig assumes hereditary anomalies in the development of the sphenoid bone and the foramen opticum.

Most of the modern writers (Habershon and others, as well as Leber to a certain extent) suppose that there is a congenital weakness and defective power of resistance in the macular fibres of the optic nerve, which is propagated through the members of a family, and which under certain as yet unknown conditions, results in an inflammatory lesion.

This view is strengthened by the fact that many of the affected individuals exhibit other nervous symptoms, mostly indeed of a trivial character, and are members of families of neuropathic type. Neither alcohol, nor tobacco, nor sexual excess has been proved to have any definite connection with this disease.

As the disease seems to follow a special type in each family, the prognosis in a particular case depends upon the family type of the affection. Therapeutics are as yet purely experimental, but the disease can be stamped out by infertility on the part of the female offspring of the females of an affected family, and Nature seems to be striving towards this end herself, as the fertility of the females in these families lessens in the course of succeeding generations.

The paper concludes with an account of 7 more cases in six families, and an exhaustive list of the literature of the subject.

J. B. S.

CASEY A. WOOD (Chicago). Ocular Evidences of Hysteria. *American Journal of the Medical Sciences*, January, 1899.

G. BOREL (Neuchâtel). Traumatic Ocular Hysteria. *Annales d'Oculistique*, January, 1900.

These two papers deal with a subject on which there is comparatively little literature in English.

Wood states that probably the most important hysterical eye signs consist of anomalies of accommodation.

The range of accommodation may be limited at both ends, and the *punctum proximum* and the *punctum remotum* approach and even coincide, a false myopia being developed by spasm of the ciliary muscle.

Amblyopia is often present, and whereas in all other diseases the colour-fields are affected *pari passu* with the white, in hysteria the colour-fields are less affected than that for white, and those colour-fields which normally are

more extensive are attacked rather than those which are small in extent, the result being an inversion of the relation of the fields; thus the field for blue may be found to be smaller than that for red, and both larger than the white. In presence of such a condition there can remain no doubt as to the diagnosis.

When there is no apparent structural lesion, any form of blepharospasm, tonic, clonic, transitory or permanent, unilateral or bilateral, should suggest hysteria; with the blepharospasm photophobia is often associated, and either may be very marked. Monocular diplopia or polyopia may be developed by simple suggestion in many cases; a ring scotoma is very frequently a sign of hysteria. Anæsthesia of the palpebral skin and ocular conjunctiva, and pseudo-paralytic ptosis are also observed.

Cases should not be looked for in women only, but also in children and in men, and it should always be remembered that functional disturbances may be accompanied by organic disease.

Ocular muscular troubles are apt, according to Borel, to pass unrecognised in ocular hysteria, but they are valuable as helping to delineate the clinical types, because they are susceptible of accurate determination.

The symptomatic picture of "grande hystérie" in its most perfect form may be regarded as a collection of individual symptoms; any one of these, however, may exist alone, thus constituting mono-symptomatic hysteria, which occurs, especially in cases of traumatic origin, comparatively rarely in ordinary hysteria. Borel gives particulars of four cases, the first three of which followed railway accidents. Hysteria may, in such cases, affect the eye secondarily, the primary symptom appearing in some other organ; on the other hand, the least wound of the eye is capable of setting up an hysteria that eventually spreads through the whole body. Often the symptoms supervene so insidiously that the diagnosis of hysteria is at first impossible. He lays stress on the fact that the motor ocular troubles may be one of the earliest signs of the neurosis, and that it is not until further manifestations appear that the real diagnosis can be arrived at.

The first case described is that of a girl aged 21, who sustained a slight blow on the right brow. Nothing was noticed until some days later, when she found herself entirely unable to follow her employment owing to a marked asthenopia and supra-orbital neuralgia at the position of a very fine scar. A month later hemianæsthesia of the body was noted. There was also contraction of the visual field, accompanied by a spastic astigmatism (!) and an epiphora without any organic lesion. The symptoms disappeared in about one year, but a permanent change of character persisted.

The second case was that of a young girl who had sustained a slight blow on the left eye. The vision of the left eye vanished and that of the right became reduced to one-fifth. The pupillary reflexes were abolished. Other symptoms were: left hemianæsthesia, congestion of the face, epiphora, monocular diplopia, and later vertigo, delirium, violent vomiting and persistent constipation. The case resembled meningitis, but suddenly the severe symptoms disappeared and simple hysteria with hemianæsthesia and contracted fields remained for a time.

In the third case the peculiar features were: sciatica, pleurodynia, change of character, facial vasomotor troubles, with congestion of the conjunctivæ and optic papillæ. Four months after the accident epiphora, asthenopia, and a varying amount of myopia were present. The asthenopia Borel attributes to a loss of the muscular sense of the ciliary muscle and resulting inco-ordination. Not until five months after the accident was a contraction of both fields found. Later, myopic astigmatism, absolute left hemianæsthesia, and monocular diplopia of the left eye developed, with intermittent erythropsia.

The above three cases were the result of scarcely appreciable causative lesions and yet the incapacity for work lasted over one year and even *after compensation had been paid* to the patient; none of the subjects had previously manifested any hysterical or other nervous symptoms. It is therefore necessary to bear in mind the possibility of such a condition arising when examining cases of

asthenopia following an accident. The so-called "period of incubation," of hysteria after trauma, has been previously noted by Charcot, and it is curious that the most marked symptoms are present six to eight months after the inception, in spite of treatment and suggestion.

That mental shock, as in the case of a railway accident, might be supposed to have considerable influence, is not a necessity for the production of such symptoms, is shown by one case reported at great length by Borel. It was that of a strong healthy man who had the following symptoms for months, after receiving a small chip of metal in the left cornea (easily removed):—mydriasis, insufficiency of convergence, erythropsia, monocular diplopia, photophobia, blepharospasm, cyanosis of the face, and venous congestion of the fundus. His character changed also from gay to morose, and he suffered from evil dreams.

Six months after receipt of the injury the following symptoms were called forth, always in the same order, by attempts to use the eyes: asthenopia, micropsia, monocular bicoloured diplopia, hemierythropsia, amblyopia, epiphora, paresis of accommodation and mydriasis, and lastly hemihyperidrosis of the face.

The right cremasteric reflex was abolished, and the muscular sense on the right side was seriously impaired. Absolute right hemianæsthesia for heat, cold, pain and touch was present, including the conjunctiva; smell on the left side was abolished and the left field was much more contracted than the right; he had lost all sexual power. Contracture of the right leg muscles, and a left oculo-glosso-labio-facial hemispasm and tremor of the right hand were present. The symptoms gradually disappeared and he completely recovered.

The prognosis in cases of traumatic ocular hysteria must be very guarded, especially after railway accidents, as the eventual loss of personality and the permanent transformation of the moral character, when these occur, are matters of the profoundest importance.

In the last above-mentioned case the loss of the sexual characteristics in a male is likened to the cessation of

the menses sometimes met with in hysteria in women. Lacrimation is sometimes the initial and only sign of hysteria, and is often accompanied by blepharospasm, anæsthesia of the conjunctiva and spasm of accommodation; it is generally more marked indoors than outside. Surgical interference is not called for.

Borel considers the artificial production of facial hemi-hyperidrosis and epiphora by suggestion, a convincing proof that the seat of the vaso-motor disturbances in traumatic hysteria is in the cerebral cortex.

In the second above-recorded case the hysteria assumed a form so violent that the diagnosis of tubercular meningitis was arrived at. It would appear practically impossible in some cases to distinguish between hysteria and true meningitis, if we accept the extraordinary statement of the author that even in hysteria hyperæmia of the optic disc and serous exudations are met with. The ultimate issue alone would determine the diagnosis.

J. GRAY CLEGG.

A. v. REUSS (Vienna). Spontaneous Absorption of Senile Cataract in the Intact Capsule. *Centralblatt für praktische Augenheilkunde. February, 1900.*

Our knowledge of the conditions under which it is possible for spontaneous absorption of the cataractous lens to take place—a very rare occurrence, of course—is still meagre, and yet it is to a high degree desirable that we should know better, for until we do so we cannot tell whether it is possible that any attempt to deal with cataract without removal of the lens can ever be doomed to any result other than failure. Up to the present time some thirty or so of cases have been put on record. Reuss first of all describes two cases which he has himself seen, of which the first was published in 1885, but seems to have escaped the notice of all other writers on this topic. It is that of a man, E. L., whose right lens was extracted for cataract in 1868, obtaining vision = $\frac{30}{100}$. In 1874,

when he was 60 years of age, he suffered from an acute iritis, and was then observed to have a hypermature cataract in the left eye, but in 1876 the cataract had disappeared, except for a small sharply-defined nucleus about 3 mm. in diameter, lying at the level of the lower edge of the pupil. Above, the pupil was quite black; vision $\approx \frac{20}{50}$, and Jaeger 4, with + 5 and + 10 D. respectively. In the operated eye there were a few vitreous opacities, and a small patch of choroiditis at the macula.

The more recent case was that of a man aged 75, whose left eye had undergone extraction for cataract in 1884; good sight had been obtained, but it had ultimately failed. The following year he had an attack of glaucoma in the right eye, which had yielded to poultices. He had a similar illness in 1898. About four months before Reuss wrote he began to find the vision in the right (unoperated) eye improving, and from p. l. it rose to $\frac{6}{9}$ with + 12, and J. 3 with + 16 D. The a. c. was deep, the iris tremulous, the pupil black, there was distinct cupping of the disc, tension was normal, and the field of vision intact; close to the lower margin of the pupil a very fine transparent membrane could be faintly seen with a few white spots on it, but nothing that one would call transparent capsule. Below this a small dark body could be seen, which was probably the shrunken nucleus. Although the patient admitted that on one occasion he had fallen and struck the back of his head, there was no real ground for supposing that the capsule had been ruptured; it appeared to be a genuine case of absorption within the intact capsule.

It used formerly to be believed that this was quite impossible, and Szili, who recorded one of the very early cases, felt himself called upon to suggest that as in his case the lens had swollen up very rapidly, the capsule might perhaps have ruptured spontaneously. It appears, too, that in a number of such cases the suspensory ligament gives way, and the shrivelled lens sinks downwards; in the more recent of the two cases above recorded this had probably occurred. It is possible indeed that spon-

taneous luxation might precede absorption, but the comparatively healthy condition of the fundus and the possession of almost normal vision are distinctly not in favour of any such assumption. In a certain number of the cases recorded by other writers also, it is to be observed that inflammation of one or another part of the uveal tract preceded the absorption, but what influence, if any, this can have upon such a result is not quite clear.

VICTOR MILLER.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, MAY 3, 1900.

CLINICAL EVENING.

Mr. G. ANDERSON CRITCHETT, President, in the Chair.

Opaque Nerve Fibres.—Mr. Nettleship gave notes of two cases in which opaque nerve fibres were observed, not as usual bordering the disc, but separated from the disc by a considerable interval. In one case "double optic neuritis, believed to be due to cerebral tumour, was present when the retinal patch was first observed. When the nerve, and with it the nerve fibre layer of the retina, afterwards passed into atrophy, the opaque nerve fibres almost disappeared." At the time, the interpretation of the appearance remained in some doubt, but since then other cases of opaque nerve fibres separated from the disc had been described, and Mr. Nettleship had himself quite recently met with a second similar case in a healthy eye. "It will be interesting," he concluded, "to hear whether optic atrophy is known to be followed by the disappearance of congenitally opaque nerve fibres, either when they involve the disc in the usual manner, or when lying in the retina."

Mr. Adams Frost mentioned a case in which opaque nerve fibres had been observed in an eye which was subsequently attacked by glaucoma simplex, the result being that the opaque nerve fibres disappeared. Mr. Doyne mentioned a case in which opaque nerve fibres had *not* disappeared after an attack of optic neuritis.

Optical Iridectomies for Lamellar Cataract.—The President showed a boy on whom he had performed a small optical iridectomy downwards and inwards, in each eye. The patient had

lamellar cataracts with small central nuclei and almost transparent peripheral portions of each lens. The margin of the central opacity was very clearly cut. There were none of those unpleasant little white radiating lines like stalactites, and such were the conditions in which he thought the operation suitable. His father had operated by this method thirty or thirty-five years ago, and he had seen several of his cases recently, in none of which had the opacity increased. The cases did not, it was true, obtain perfect vision, but he claimed three advantages for the operation in appropriate cases: (1) that it made the patient independent of glasses; (2) that an eye which possessed its lens was on the whole safer with regard to the future than one from which it had been removed; and (3) that if the lenses did become opaque his small iridectomies would not exercise any adverse influence, but rather the reverse, on any operation which might be subsequently adopted.

In reply to Mr. Holmes Spicer, the President said that in this operation he used a small needle set at an angle, and withdrew the iris with a Tyrrell's hook, the incision being not too peripheral. In one case he had had to operate for senile cataract on a patient already operated on by his father, many years before, for lamellar cataract, by this method. In this case he had a Graefe knife specially constructed at an angle, in order to make the incision on the inner side. He enlarged the previous iridectomy, and the lens came away perfectly.

In reply to Mr. Frost, the President admitted that the cases suitable for this operation were very exceptional. In the case shown that evening, before operation the vision of the two eyes was improved from $\frac{7}{60}$ to $\frac{6}{4}$ and $\frac{6}{8}$ respectively, and it was only in such cases that similar improvement could be expected from an optical iridectomy.

Mr. Nettleship said that though the operation was well adapted for the case shown, such cases were exceedingly rare, and the more common mistake was, to make an artificial pupil, where removal of the lens would have given a better result. With regard to what the President had said about projection of spicules into the cortex being a bad sign, he would like to know whether any cases were on record where such spicules had actually been observed to extend. Apart from cases of senile cataract, he himself had never seen one. Those cases of lamellar cataract in which the sight did become worse were due, he thought, to the part which was already opaque becoming more so.

The President replied that he had not seen the spicules extend further into the cortex, but he had seen them become wider, thus

rendering opaque the previously clear spaces between them. He had seen cases of this sort at the age of 40 or 50, on which his father had operated many years before. He quite agreed that it would be a pity if the operation was adopted at all universally.

Eye changes in a case of Bullet Wound of the Head.—Mr. F. M. Ogilvie read notes of this case. A bullet had entered the right temporal fossa, traversed the right orbit without piercing either the eye or optic nerve, proceeded through the posterior ethmoidal cells and superior meatuses of the nose, and finally lodged in the left orbit, resting against the posterior and inner part of the eye-ball, where its position was beautifully demonstrated by a series of skiagrams taken by Mr. Mackenzie Davidson. The right eye, though not pierced, had been injured so much that it had been excised. In the left eye the only evidence of injury was the appearance of a "small hole at the macula, as though this part of the retina had been bodily removed in some way or other," with a corresponding small central absolute scotoma.

The President said that he had recently seen a young officer wounded at Magersfontein. A bullet had entered the left fronto-parietal suture, passed downwards through the left orbit, and emerged through the lower jaw. The patient had not lost consciousness. The left disc was in a state of atrophy.

Mr. Nettleship said he had just seen another wounded officer in whom a Mauser bullet had entered at the junction of the malar and superior maxillary bones, and had come out just over the articulation of the lower jaw on the same side, the left. The eye was almost absolutely blind, although the course of the bullet was such that it would not touch the eye-ball, or at any rate the optic nerve. There were, however, extensive scar changes in the retina and choroid, which in a rough way corresponded with the position of the bullet. He presumed the optic nerve must have been damaged, but did not think the lesions caused in this way without any actual wound of eye-ball or nerve had been fully explained. Possibly there had been an extensive hæmorrhage into the sheath of the optic nerve, causing it to atrophy. He had also seen a case very similar to Mr. Ogilvie's, in which a bullet had entered one temple and lodged in the opposite orbit without causing any serious symptoms except loss of sight.

Mr. Johnson Taylor said he had seen a man shot in the right occipital region with a pistol bullet. Some brain substance was lost, but ultimately he completely recovered, with the exception of left lateral hemianopia.

Protrusion of Eye-ball on Stooping.—Mr. Reginald Bickerton showed this case, which was that of a charwoman, aged 61, whose

right eye became markedly proptosed on stooping, with considerable pain if this position was maintained. Compression of the jugular had a similar, though less marked effect. On resuming the erect posture, the position of the eye became normal (no enophthalmos). There was no pulsation or bruit, and no history of injury. There was a central corneal nebula and operative coloboma. Vision $\frac{1}{80}$. Double mitral murmur. Mr. Doyne said he had had a similar case in a man of 25, with symptoms of orbital cellulitis. The condition gradually subsided, leaving the eye blind, without any tendency to proptosis.

Mr. A. Hugh Thompson said he had shown a case similar to Mr. Bickerton's three years ago. On looking up the literature of the subject he had found that about half the recorded cases were traumatic in origin.

Macular Coloboma associated with old Choroiditis.—Mr. W. T. Lister showed this case, which was that of an annular coloboma of the choroid at the left macula with apparently inflammatory changes inside the ring, while in the right eye, some way below the macula, was a round white patch of apparently inflammatory exudation.

Mr. Lawford said that the case was interesting as bearing on the question whether these cases were developmental or inflammatory. He took the view that they were due to inflammatory conditions occurring either during foetal life or very soon after birth.

The President agreed with this view.

Congenital Notch in each Lower Lid.—Mr. Treacher Collins showed a boy of 8 with a shallow notch in the margin of each lower lid a short distance from the external canthus, and directed downwards and outwards. Below each eye there was an unusual want of prominence in the malar bone. The notches differed in position and direction from colobomata of the lower lid, due to failure in the closure of the facial cleft.

Corneal Deposit, apparently of Silver Chloride.—Mr. Stephenson showed a boy who had been treated for trachoma with solid nitrate of silver, afterwards irrigated with sodium chloride solution. He concluded that the cornea must have been accidentally touched with the caustic. The deposit on the cornea, apparently of silver chloride, was gradually becoming less dense.

The President had had a similar case in which considerable improvement took place.

The following were also shown :—

Dr. Emile Berger's Binocular and Stereoscopic Lens.—Mr. Juler.

Case of Proptosis with Ophthalmoplegia Externa.—Mr. Juler.

Specimen of Sarcoma of Choroid.—Messrs. Higgins and Ormond.

Congenital Aniridia in both Eyes associated with displaced lenses and Glaucoma—Mr. Rayner Batten.

FRENCH SOCIETY OF OPHTHALMOLOGY.

JANUARY, 1900.

Recueil d'Ophtalmologie, February, 1900.

Ocular Manifestations in Typhoid Fever—Optic Neuritis.—M. Koenig: Leaving out influenza and malaria, one finds but little notice taken in the classical text-books of the ocular troubles occurring in infectious diseases. The chief ocular complications in typhoid fever are: retinal hæmorrhages in the acute stage preceding or accompanying intestinal hæmorrhages, and often associated with optic neuritis (Bull); conjunctivitis and phlyctenular keratitis; kerato-malacia (Berger); an alteration of the corneal epithelium from dryness of the surface of the globe, a true xerophthalmia, due to paralysis of the secretory nerves of the lacrimal and Meibomian glands, with consequent interstitial corneal abscess, which occurs occasionally in convalescence; partial temporary loss of accommodation, as in diphtheria; paralysis of the extrinsic muscles; plastic or serous iritis; cyclitis; choroiditis. Optic neuritis is a rare complication of typhoid fever; it occurs as a peripheral neuritis, that is to say, the œdema of the disc is but little marked; "choked disc" has never been noted.

M. Koenig's case was that of a girl, aged 23, who had a previous history of epileptic fits. At the end of the third week of the fever external strabismus of the right eye without ptosis came on. When seen by Koenig she had a double optic neuritis, white infiltration overspreading slightly the irregular edges of the disc, somewhat engorged veins, mother-of-pearl whiteness of the centre of the disc. All signs were more marked in the right eye. The right pupil did not act to light or consensually; the left pupil reacted. The fields of vision were narrowed. A relative central scotoma was discovered on the right side. Vision of the R.E. was perception of light; of the L.E., $\frac{1}{2}$. Subsequently the vision improved to, R.E. = $\frac{1}{6}$, L.E. = $\frac{1}{2}$.

M. Koenig had no doubt that epilepsy was not the determining cause of the neuritis, for it was true epilepsy, not Jacksonian, and it had existed before the typhoid fever.

The most probable hypothesis regarding the occurrence of optic neuritis is that it is due to a direct toxic infection of the nerves, progressing by way of the sinuses. In those cases in which there is an important lesion of the base of the brain, with serous exudation into the lateral ventricles, this must constitute a factor also.

Congenital Ocular Lesions in a Child whose Mother suffered from severe Typhoid Fever towards the end of Pregnancy.—M. Antonelli related the case of a child, of good personal and family history, who was born at full time but only weighed 3 lbs. at birth. When seen by M. Antonelli, both eyes had striæ of cortical cataract and a speck of anterior polar cataract; there was slight nystagmus. Double iridectomy had been performed at the Quinze-Vingt three years before. Both eyes showed signs of previous optic neuritis (pale, grey, irregular discs, with vascular alterations) and diffuse chorio-retinitis (irregular mottling of the fundus, patches of granular pigmentation).

The acuity of vision was, R.E. — $\frac{4}{60}$ with no amelioration; L.E. — $\frac{5}{60}$, with + 10 D. sph. — 0.1.

M. Antonelli was of the opinion that as optic neuritis, chorio-retinitis, &c., can be caused by typhoid fever as toxic manifestations, there is no reason why a child born of a mother who suffered from severe typhoid fever late in pregnancy should not manifest similar signs. He considered the affections of the lens to be secondary to the chorio-retinal trouble.

M. Morax was of opinion that this hypothesis was far-fetched, and that the cicatricial lesions were most probably caused by the localisation of the bacillus of Eberth in the retina, &c., and not by a toxin. The degenerations left in nervous elements which have been attacked by toxins can scarcely be recognised under the microscope.

M. Boucheron pointed out that the chief cause of lesions of the choroid was hæmorrhage, which lasted, as such, but a short time, so that one finally sees atrophic cicatrices whose cause is difficult to elucidate.

M. Antonelli, in reply, said that direct experimental proof of the action of toxins, especially in typhoid fever, was wanting. Still, in his opinion a toxic neuro-retinitis and chorio-retinitis might attack the fœtus or the newly-born child of an infected mother, as it is well known that organic poisons (toxins, ptomaines, leucomaines) and microbes can pass through the placenta. Regarding the hæmorrhagic origin of atrophic chorio-retinitis, he thought that was true if there were isolated disseminated patches, but if it was a diffuse form he considered it to be due to a chronic intoxication.

FEBRUARY, 1900.

Ethmoido-frontal Sinusitis following Orbital Cellulitis due to a Dacryocystitis.—M. Antonelli related the case of a young woman, aged 25, who sought relief on account of lachrimation and, as she said, a lacrimal tumour of the right eye. The upper canaliculus had been slit, yet, from cicatricial contraction of its inner end, a style could not be passed into the nasal duct. The tumour was of the size of a large bean, divided in two by the internal palpebral ligament, the greater part being above the ligament. The tumour protruded but little, was soft, almost fluctuating, non-reducible, fairly mobile, and but little painful to pressure. Notwithstanding all manipulations nothing came out of the sac nor down the nose. The tumour had steadily increased in size for some three weeks. The diagnosis lay between a peri-cystitis (*i.e.*, a chronic encysted orbital cellulitis) and an ethmoidal empyema which had found an exit at the side of the orbit. The eye was otherwise normal.

Though the case was twice examined by a rhinologist no abnormality could be found in the sinuses. Under chloroform the cicatricial contraction of the upper canaliculus was divided, and a large quantity of pus escaped. A style could then be passed into the nose through the nasal duct, which was bare in places.

As the abscess appeared to be deep in the orbit, the upper lid was divided in a curved line for about two centimetres in the furrow between the orbit and the lid. Through this incision a large quantity of yellow odourless pus came out. The cavity having been douched out was probed and found to be funnel-shaped, the apex being deep in the orbit. On the inner wall several bare patches of bone were found. For nearly two months the cavity continued to get better and relapse, notwithstanding careful antiseptic treatment, so the nose was again examined with a negative result. However, towards the end of the second month a well-marked ethmoido-frontal sinusitis appeared which was operated on, and at the end of the fourth month the patient was discharged well.

M. Antonelli pointed out that the connection between lacrimal affections and sinusitis was generally noted only with reference to diagnosis, and that the orbital cellulitis, which usually followed purulent dacryocystitis or maladroit probing, was generally acute ; in his case it was chronic. The path from the orbit to the ethmoidal sinus was through the anterior ethmoidal canal or the interstices of the sutures.

M. Jocs pointed out that purulent dacryocystitis might give rise to limited orbital cellulitis or to a generalised orbital cellulitis.

The first class was common ; the second class was far rarer and more severe, leading perhaps to complete atrophy of the optic nerve.

M. Valude drew attention to a case of his own in which, from the maladroitness of a lacrimal probe, a false passage was made. At the end of some days a scarcely perceptible exophthalmos appeared, with little difficulty in moving the eye, not much pain, no exacerbations, no sign of phlegmon. At the same time the acuity of vision was lowered and the optic nerve appeared pale. The cellulitis disappeared rapidly, but the optic nerve was atrophied and the vision reduced to *nil*.

M. Antonelli, in reply, was glad that his case was supported by M. Valude's observations, and said that the fact that his case was chronic made him hesitate in the diagnosis.

Median Flap Blepharorrhaphy in High Degrees of Exophthalmos. M. Truc.—Having tried in vain, by all the classical procedures, to protect the cornea of a woman who had severe exophthalmos from orbital cellulitis, M. Truc was compelled to have recourse to the following operation: In each lid two vertical incisions were made enclosing in each lid a flap as broad as the cornea. The edges of the lids were then sutured together without freshening them. The result was that the central flaps protected the cornea, and the sutures easily lasted for several weeks until the exophthalmos had gone. The edges of the flaps were then easily united and left no deformity.

Encysted Hydropsy of the Sac of Tenon.—M. Lagrange (Bordeaux) described the case of a man, aged 64, who had noticed for three months lessened acuity of vision in his right eye. Associated with this was a marked exophthalmos, the eye being protruded forwards and a little outwards. All round the orbit a resisting tense tumour could be felt surrounding the globe, only allowing slight inward movement of it. The globe was regular in shape; the tension $+1$; the conjunctiva only a little œdematous and without inflammation; the eyelids not swollen, and capable of being shut over the eye by an effort. Pain was marked, continuous, with exacerbations radiating to the frontal region. The acuity of vision had fallen to $\frac{1}{25}$, owing to an optic neuritis which approached atrophy. There was no anomaly of refraction, and the media were transparent. The diagnosis of tumour of the optic nerve was made, and it was proposed to remove the growth, alone if possible, but if not, the globe.

The method practised is M. Lagrange's own,¹ and shortly is as

¹ *Recueil d'Ophtalmologie*, 1892.

follows : After canthotomy the external rectus is cut away from its insertion, its end being retained by a suture through the tendon. Then the neoplasm is freed by the finger or hollow sound, a suture is passed beneath it so as to surround it tightly, and the optic nerve is cut at the apex of the orbit. By pulling on the neoplasm the posterior end of the optic nerve can be brought into view. In the present case, during the freeing of the neoplasm a jet of clear yellow liquid escaped and flowed over the field of operation. The growth collapsed, and the optic nerve could be felt to be healthy. The cavity was scraped and douched out, the external rectus sutured to its insertion, the conjunctiva and skin sutured. All healed by first intention, and though the acuity of vision only improved to $\frac{1}{16}$, still the result was satisfactory in all other respects.

M. Lagrange pointed out that though his diagnosis was mistaken, still his method of operating permitted him to rectify the mistake. He thought that the case was one of a collection of fluid, something like hydrocele fluid, between the globe and the capsule of Tenon. He referred to three cases of a similar kind reported by Caron de Villard in 1858.

M. Antonelli thought that by detaching the internal rectus temporarily, and dislocating the globe to the temporal side and forwards (after external canthotomy), one could more easily resect the optic nerve.

M. Valude considered that M. Lagrange's operation was only suitable for tumours of the optic nerve which were situated behind the globe and did not fill the orbit. On the other hand, when it was a question of a minute and complete evisceration of the orbit, as for a malignant tumour, he thought Krönlein's operation the best.

FRANK C. CRAWLEY.

COLLEGE OF PHYSICIANS OF PHILADELPHIA, SECTION ON OPHTHALMOLOGY.

Dr. GEORGE C. HARLAN, Chairman.

DECEMBER 19, 1899.

Traumatic Varix of the Orbit in which Ligation of the Left Common Carotid Artery was successfully performed. Dr. C. A. Oliver.—The patient, aged 27, had been struck in his left eye five days before being seen. At 4 years of age he was caught between two railroad cars, inflicting such an injury to his head

that he bled from the mouth, nose and ears. There was palpebral swelling, conjunctival œdema, and proptosis. The globe was almost immobile, the iris was fixed, and the retinal veins were engorged. There was a temporal but not orbital bruit. Transient pressure on the left common carotid caused the eye to sink into place and the venous stasis in and around the orbit to subside. These symptoms increasing in spite of continuous compression upon the left common carotid, ligation of the vessel was performed by Dr. T. S. K. Morton, resulting in an immediate cessation of most of the symptoms. For the first time retinal venous hæmorrhages could be seen. Five months later the eye had become blind from secondary glaucoma, while all of the previous symptoms had disappeared.

The early accident probably was the beginning of either an aneurysmal varix between the petrous and cavernous portions of the internal carotid artery and the corresponding cavernous sinus, or a varicose aneurysm between the two in which there was an intervening sac or so-called false aneurysmal connection. In either case the lesion was in a protected situation and subjected to little arterial pressure. Therefore it grew slowly or may have remained stationary. The more recent blow upon the diseased region probably increased the opening into the venous structures and gave rise to the orbital varix. The appearance of absolute secondary glaucoma as the final outcome of the condition of the ocular tissues may be in measure understood when it is considered that the eyeball is a lymph-producing organ, which is dependent upon normal blood supply.

Discussion.—Dr. de Schweinitz mentioned an analogous case of pulsating exophthalmos from varix in the cavernous sinus in which the bruit and pulsations were controlled by pressure upon the right carotid. The patient had double optic neuritis. Under treatment by rest in bed, intermittent pressure on the carotid, and potassium iodide in large doses, the bruit and headache, from which the man severely suffered, were lessened. Twenty-one months later the eyes had partly receded. There were a few new and old hæmorrhages in the retina, and the retinal veins were still enlarged, but there was no neuritis, and the bruit and visible pulsation were entirely gone. This result was effected by an apparatus designed by the patient, by which the carotid was mechanically compressed against the spinal column. This was applied by the patient himself for hours together.

Dr. Risley described a patient with similar symptoms, but without the neuritis. Pressure upon the carotid stopped the bruit, and under potassium iodide the exophthalmos disappeared. An ex-

ploratory puncture of the orbit revealed a small orbital aneurysm. It is probable that a clot was formed as the result of pressure upon the carotid, and the clot slowly enlarged by accretion, thus curing the aneurysm.

Dr. Harlan described a similar case in which good results followed intermittent compression after continued compression had failed. The patient, a brakeman, injured on a moving car, had extensive exophthalmos, pulsation and bruit, with pain, but little impairment of vision. Twenty-four hours of uninterrupted compression produced very slight improvement. Subsequently the patient used intermittent pressure by means of a stick handily shaped and padded at one end, and found that he suffered less from headache. After three years of this treatment the symptoms entirely disappeared.

Traumatic Rupture of the Choroid with Hemorrhage from the Upper Branch of the Inferior Temporal Vein.—Dr. Oliver exhibited three water-colour sketches of this condition illustrating various stages.

Dr. Harlan stated that to him the most interesting feature of this case was the late appearance of extensive changes in the macular region, though there was no indication of injury at that point immediately after the accident.

Prolapse of the Iris after Simple Cataract Extraction.—Dr. G. C. Harlan reported two cases, and referred to two others in which prolapses occurring during treatment were replaced with excellent results, and submitted the following conclusion: Prolapse of the iris during the after-treatment of simple extraction is by no means so serious an accident as many authorities have considered it; very small herniæ may safely be let alone, unless they interfere with closure of the wound; the best treatment for a large proportion of more extensive prolapses is prompt abscission, though infective inflammation of the iris or conjunctiva may necessitate delay; in a certain number of cases there may be a third choice of treatment besides abscission and expectancy, namely replacement. This presupposes the absence of adhesive or septic inflammation.

Discussion.—Dr. Wm. F. Norris: We agree in thinking prolapse of the iris after simple extraction an unfortunate and dangerous complication. It is not, however, peculiar to this method of operation, and all of us who in years gone by cultivated the periphtric linear (Graefe's) operation will well remember the occasional entanglement of the cut edges of the iris in the wound and the formation of cystoid cicatrices. The position of the wound has much to do with its occurrence or non-occurrence. It was long

ago pointed out by Arlt that the incision should be in the clear cornea, just inside of the limbus, thus allowing ample room to evacuate the lens and leaving a narrow rim of corneal tissue around the entire incision. As we well know from the making of iridectomies for glaucoma, the more peripheral the wound the easier the iris prolapses into it. In the two hospitals with which I am connected I have made 168 simple extractions. Ninety-eight of these were done in one institution and 70 in the other. I need hardly say that I have used every effort to perform the operation as well as I could in each instance, but the result in the two series of cases has been most different. In the 98 cases I had only 3 prolapses, or 3.1 per cent. In the series of 70 I had 7 prolapses, or 10 per cent. I believe that the better result in the series of 98 cases is largely due to the better nursing. In this institution special nurses are provided to sit alongside of the bed day and night, while in the other attention is less incessant, which results in a much higher percentage of prolapses. As to treatment, I believe that large prolapses should be cut off, and that small ones are best treated by careful bandaging.

Dr. Risley reported the main points in the history of 31 cases of simple extraction of cataract. Secondary operations were performed in ten of the eyes. The pupil was ovoid, distorted by adhesions between the periphery of the iris and the wound in some portion of its course in three eyes, and in one was tucked in the angle, giving rise to the appearance of a typical coloboma as after iridectomy. Prolapse of the iris through the wound occurred three times. Twice it was discovered on opening the eye on the morning of the second day, and in both cases was excised, and in both the eyes did well, resulting in V. $\frac{5}{8}$ in one and $\frac{6}{12}$ in the other. In the third case the prolapse occurred on the morning of the fifth day while the patient strained to urinate in his desire to avoid catheterisation. The wound was ruptured near the inner angle, and a small hernia of the iris was found protruding at this point, but as it was covered by the conjunctival flap, it was allowed to remain, and treated by a compress bandage.

In every case of prolapse, or distortion of the pupil due to a threatened prolapse, this result was foreshadowed at the time of the extraction, except in the man who caused a reopening of the well-healed section by straining in his effort to urinate. In each of the other cases the operation-notes indicate that the iris showed a tendency to prolapse during the operation. Dr. Risley believed that a faulty technique in the operation explained the tendency to prolapse in many cases, while in others it was probably due to the accumulation of cortical material or vitreous behind the iris in

the line of the corneal section. But even in these instances the prolapse might be avoided by careful after-management of the patient. He was therefore entirely in accord with Dr. Norris as to the importance of care in the after-treatment, especially during the first twelve or twenty-four hours. He was of the opinion that prolapse not infrequently occurred in cases where the tendency existed either during the primary dressing (by the man straining to lift his head for the application of the bandage) or while being transferred from the operating-table to his bed, or by a jolt on the ward truck, &c. He believed that a conjunctival flap rendered prolapse less probable by the more speedy healing of the wound which it promotes. In only 2 of the recorded cases was the restoration of the anterior chamber delayed beyond the morning of the second day—thirty-six hours after the operation.

Dr. de Schweinitz said that he selected cases for simple extraction, and believed that when the eyeball was hard, the lens was large, the iris was not readily dilatable, the ciliary region was irritated, the cataract was unripe, and when the patient's mental or physical condition tended to create restlessness, the combined method was preferable. He recorded forty-nine simple extractions with three iris prolapses. Of these three prolapses, one was restored on the sixth day by the use of eserine, the resulting vision being $\frac{5}{8}$; in another the prolapse was abscised in the usual manner and the edges of the wound stitched, the resulting vision without capsulotomy being $\frac{2}{5}$; in the third case, one of large prolapse occurring in a refractory patient, iritis resulted, with closure of the pupil. In two other cases, an hour after the operation, the eye was inspected, and, as the iris showed a tendency to prolapse, a small iridectomy was performed. In some of his simple extractions he had not secured a perfectly round pupil, owing either to anterior synechia or attachments of the iris to the capsule; but in these there was no protrusion of the iris between the lips of the wound, and they were therefore not classified as prolapses. Following the teachings of Drs. Norris and Risley, he had believed until recently that one of the most potent causes of iris prolapse was restlessness or movement of the patient shortly after the operation, and yet the three prolapses which he had described had all occurred in patients operated upon in the beds in which they afterwards remained, and who had been watched by efficient trained nurses. On the other hand, after operation the patients were transferred from the operating-table to a stretcher, then taken to the third floor of the hospital, removed from the stretcher to the bed, and there had been no prolapse. It would seem, therefore, that some other cause besides movement or restlessness

on the part of the patient was the most potent agent in causing prolapse, and he thought that inaccuracy in making the section was probably the one to be most reckoned with in this respect. Dr. de Schweinitz did not believe in the use of eserine or pilocarpin either to prevent iris prolapse or to attempt to restore it after it had occurred. If the iris prolapse was noted soon after its occurrence, he would cut it off and reduce the edges of the iris; in other words, attempt to make a clean iridectomy. If it was not noted until the third or fourth day, and the prolapse had become incarcerated, he would treat the eye with a pressure bandage and atropin, believing that the latter agent did not increase the prolapse, and on the other hand prevented iritis. Necessarily, however, circumstances must alter methods, and each case must be studied by itself. He reported three interesting complications in connection with his series of simple extractions: (1) Complete eversion of the flap twenty-four hours after the operation, replacement, good result; (2) delayed union of the wound, the iris remaining perfectly in place until the seventeenth day, when it became attached to the margin of the wound, but did not prolapse, anterior chamber closed next day; (3) high astigmatism forty-eight days after operation, with $+5$ S. $\odot + 10$ C., axis 170° , $\frac{1}{8}$. Sixteen months later the glass accepted was $+9$ S. $\odot + 3$ C., axis 5° , $\frac{6}{7.5}$. Dr. de Schweinitz agreed with Dr. Harlan that delayed union of the wound did not favour prolapse, and that adhesion of the iris to the lips of the wound might be the means of restoring the anterior chamber. In conclusion, Dr. de Schweinitz referred to a method of dealing with prolapsed iris which he had seen Dr. Trousseau employ—viz., simple transfixion of the prolapse with a Graefe knife, without an attempt to excise the hernia.

Dr. Oliver considered the most important factor in the question was the great danger of infection in cases in which with the prolapse there was an open wound. He believed that undue movement immediately succeeding the operation should be avoided, and found it true that some tendency, noted at the time of the operation, often served as a precursor of the condition. He believed that if prolapse is to take place, it will, as a rule, manifest itself quite early. In the performance of simple extraction he limited himself to carefully selected cases in which there were no contraindications. In a series of 49 cases of simple extraction occurring in his practice he had found four with post-operative prolapse. They all occurred in male subjects with matured cataracts, and did not result in anything that was disastrous to the eye. He offered the following as some of his individual conclusions. Post-operative prolapse of the iris in

simple extraction is most apt to occur in cases in which the iris has protruded during the operation. It may be avoided by gentle massage of the iris through the cornea and the closed eyelids during the operation; but in all such cases the conjunctival sac must be healthy and should be freely flushed before the procedure. It should be replaced only in cases in which it is fresh, and in which the protruding iris tissue, the wound of incision, and the conjunctiva appear normal. It should be excised only in fresh cases in which the protruding iris tissue is bruised and the conjunctival sac is practically free from germs.

Dr. Thomson explained Dr. Knapp's method of after-treatment, by which it seemed Dr. Knapp gave the iris every chance to prolapse if it was so inclined. Dr. Thomson considered that the iris prolapse was largely a matter of incision. If made by a small, thin knife, exactly in the limbus cornea, the edges immediately come into contact and the wound heals promptly. In his own practice he performed more combined than simple operations; though admitting the advantage of a small, round pupil, he contended that the healing is more prolonged, that the eye is more subject to inflammations, and that secondary cataract is more frequent.

In concluding the discussion, Dr. Harlan stated that he was inclined to believe that there may be some truth in Parinaud's statement that delayed union tends to prevent prolapse, or at any rate does not favour it. Of 500 cases of cataract extraction at the Wills Hospital, recently tabulated, union was delayed beyond five days in 26 cases. Fourteen were cases of simple extraction, and in these prolapse occurred twice, in both cases within eighteen hours after the operation, and it was therefore probably the cause, but certainly not the result, of delayed union.

JANUARY 16, 1900.

A Compact Arrangement of Jäger Test-types, together with a bar of notes for musicians and a symbol which represented the needle's eye for the seamstress.—Dr. Ziegler exhibited a card on which these were combined.

Rupture of the Globe.—Dr. Ziegler also presented a patient in whom the eyeball had been preserved after an injury that caused a 12 mm. linear rupture of cornea and sclera by contre-coup, and produced prolapse of iris and ciliary body with extrusion of lens.

Persistent Pupillary Membrane.—Dr. A. G. Thomson exhibited a girl, aged 14 years, with this condition well marked in both eyes. The pupillary membranes are dense, opaque, dark brown in colour, closely resembling the iris, and connected with the anterior surface of the iris in the region of the circulus iridis

minor in each eye by filaments of apparently the same tissue, the remains of the obliterated arteries of intrauterine life. They are irregularly round in shape, and occupy almost the entire pupillary space of the undilated pupil. The eyes are myopic, 10 D.; R., amblyopic, $\frac{1}{100}$; L., $\frac{6}{50}$, and nystagmic. Lenses do not improve vision. The corneæ are slightly nebulous from ophthalmia neonatorum. Dr. Thomson stated that the patient must work for a living, and he desired the opinion of the Fellows as to the best surgical means that could be adopted to give her useful vision.

Discussion.—Dr. de Schweinitz suggested the removal of the membrane with the capsule from the pupil. This operation would develop traumatic cataract, which could be later treated by extraction of the fragments; in other words, he would treat the case as one of high myopia requiring operation. Dr. Ziegler had operated on a case by penetration of the membrane and capsule with a Hay's knife. This produced a cataract that was absorbed. Dr. Randall proposed a linear extraction of the lens as in cataract, but instead of the usual cystotomy he would endeavour to grasp the membrane with a forceps and lift it out. He believed that there was a congenital cataract beneath the membrane. Dr. Wm. Thomson remarked that when the pupil was small the threads were flexible, making division difficult. He thought discission should be done first, and after the absorption of the lens he would treat the capsular opacity by operation.

Blindness from Sympathetic Ophthalmitis, with Restoration of Vision by Critchett's Operation.—Dr. de Schweinitz reported a case occurring in a patient 53 years of age. The blindness had existed for about twenty months. A previous iridectomy and later iridocystectomy had been unsuccessful. After Critchett's operation, by which an oval clear pupil was secured, vision with a + 12 S. was $\frac{5}{30}$.

Discussion.—Dr. Charles A. Oliver stated that he had successfully employed Critchett and Story's operation for the laceration of the lens capsule and the evacuation of the lenticular contents in two cases of sympathetic ophthalmitis which had been considered as irremediably blind. Both were in young subjects,—the most favourable type for the procedure—and both presented sufficient pupillary area to reach the lens material and incise the lens capsule without touching the tissues of the iris. In one case he had used a Knapp's knife-needle for the discission, while the primary drilling into the capsule with the evacuation of the lens material and the fixation of the capsule at the time of the discission were obtained by an ordinary stop-needle. This case, in

which an ultimate permanent vision of $\frac{5}{7}$ was obtained, required three separate operations. He considered the method to have a large degree of usefulness in special types of the disease.

Complicated Cataracts.—Dr. de Schweinitz read the clinical histories of a series in which he had extracted, and gave the visual results. Among the chief complications recorded were chronic granular lids, glaucoma, clonic blepharospasm, lateral nystagmus, detachment of the retina, high myopia, choroiditis, and calcareous semiluxated lenses. He also related the histories of two cases in which the nucleus of the lens had escaped into the vitreous during extraction. The one was followed by kind healing and good vision, the other, a semi-luxated lens in the fluid vitreous, by an expulsive intraocular hæmorrhage five and one-half hours after the operation.

Discussion.—Dr. Hansell called attention to the omission from Dr. de Schweinitz's enumeration of constitutional and local causes for complicated cataracts, of the mention of secondary and tertiary syphilis, and believed from his experience that it was essential to a good result that a syphilitic subject should undergo a course of mercury and iodide before the extraction of cataract was made, otherwise the operation would be followed by the formation of a pupillary membrane, closure of the coloboma, and gummata of the iris. Dr. Ziegler had operated for cataract in six patients suffering from granular lids and dacryocystitis with good results by inserting corneal sutures, and by treating the eyes as he would open wounds—namely, without bandages and with ice compresses. In two cases he had employed the corneal suture. Dr. Harlan stated that authors differ as to what are really complications, and said that if all constitutional causes are excluded, the published reports are only of selected cases.

Oculo-motor Paresis following Indirect Violence.—Dr. C. A. Veasey reported a case. The patient, a male, aged 30, fell from his bicycle while coasting and struck his *left* temple. He was bruised and stunned, but had no cerebral symptoms, such as nausea or headache. He continued his ride for an hour and a half and noticed that objects appeared "out of place." On the following morning he had paresis of all the branches of the *right* oculo-motor nerve. The visual acuity was normal, and there was no disease of the media or eye-grounds. The accommodation returned, but the other symptoms improved but little under treatment.

Transient Real Blindness.—Dr. Harlan reported a case in the person of a delicate and nervous woman, 23 years of age, who complained of loss of vision in the left eye of three days' duration.

She said that a month before there had been double vision in each eye, which lasted three weeks, and was followed by almost complete blindness in the left. The right eye was normal in all respects. In the left vision was reduced to counting fingers at four inches. A mydriatic had been used. The media was clear and the fundus was normal, but various prism and confusion tests failed to reveal any higher degree of vision than she had admitted. Three days later there was absolute monocular blindness. All attempts to produce diplopia by prisms failed, and the test suggested by Priestley Smith, and brought to the attention of the Section by Edward Jackson, was deemed conclusive of actual blindness. When the patient was directed to look at a flame, and a prism, base toward the temple, was placed before the blind eye, there was no deviation of either; when it was held before the right eye there was evident deviation of both eyes to the left, and recovery after removal of the prism. Dr. Harlan was particularly interested in this case, because in a considerable experience with hysterical blindness he has met with only one other case in which he was unable to demonstrate that the blindness was not real.

Double Optic Atrophy from Otitic Thrombosis. — Dr. Randall reported a case in a child of 10 months. It was evidently of post-papillitic character, and was ascribed to "meningitis" occurring six months before. The history showed that no nausea, convulsions, or paresis had been present to indicate true meningitis; that pain, tenderness, and swelling had been markedly present, most of the time, about the suppurating left ear and involving with little adenitis the neck on that side. Except for the double exophthalmos, which had been extreme at the worst stage of the attack, "the meningitis was all on the left side." Thrombosis so usually follows such involvement of the cerebral sinuses with uniformly fatal result that he felt it important to record even so incomplete a history, as it bore out his claim that such conditions, if desperate in the extreme, were not necessarily hopeless.

HOWARD F. HANSELL.
Clerk of Section.

THE RECOGNISED TARSAL OPERATIONS FOR ENTROPION AND TRICHIASIS.

BY H. HERBERT, Major I.M.S.

OPHTHALMIC SURGEON, BOMBAY.

MY apology for re-opening a well-worn topic lies in the conviction that the very exceptional experience in the treatment of lid deformities enjoyed by eye surgeons in India should do something to establish order among the multitude of operations now in vogue.

The work done in this class of case during the last ten years in the Cowasjee Jehangir Ophthalmic Hospital, Bombay, divides naturally into two equal periods. In the five years, 1890-94, the only operation done on the upper lid for entropion and trichiasis was Arlt's, or an operation nearly approaching it; the number for the period averages sixty-two per annum. During 1895 a slightly modified Snellen's operation was introduced; during the year there were 43 Arlt's, 29 Snellen's and 2 Green's done. In 1896 there was a sudden great increase in the number of cases treated; there were 116 Snellen's, 8 Arlt's and 3 Green's operations.¹ To what extent this sudden rush of patients

¹ Operations on the lower lid do not come into this discussion, since in them there is no question of tarsal incision. Nor is electrolysis for the destruction of eyelashes, which was frequently performed on both lids, here considered.

was attributable to altered treatment is uncertain, for in the next year, 1897, the numbers were down lower than before, 24 Snellen's and 8 divisions of tarsus. But in this year the first plague epidemic caused a practical cessation of eye-work for a portion of the year, and succeeding epidemics have still kept down the annual figures. In 1898 there were 37 Snellen's and 19 tarsal divisions, and in 1899 exactly 34 of each of these. The majority of cases requiring operation in Bombay are combined entropion and trichiasis; entropion alone, and trichiasis or distichiasis alone, are much less common. Generally speaking, of late, division of the tarsus from the conjunctival surface has been practised where tarsal deformity was slight or absent, and removal of a horizontal wedge of tissue from the anterior surface was reserved for the more definitely deformed tarsi.

The *Divisions of Tarsus* here indicated included the application of sutures, mostly after Richard Williams' method. The lid-margin was bent forward over a small roll of plaster by sutures, firmly embedded in tarsal margin below and in skin above. In other cases a more decided bending forward was effected over a pad of wet lint, by sutures passing from lid-margin to eyebrow. These measures were in effect very similar to Green's operation; they were preferred to it simply because they occupied rather less time in execution.

Taking the principle of *Suellen's Operation* as the removal of a horizontal wedge of tarsus and overlying muscle through a skin incision, and the application of specially devised sutures, there are certain *essential details* to be observed, in order that the operation should be inherently suited to the needs of individual cases. They are :—

(1) (a) The *position of the wedge* is important. It should be as near the free margin as possible, *i.e.*,

immediately above the roots of the eyelashes. Thus there is a narrow strip of tarsus left below, and a comparatively broad plate above ; so that, when the anterior surfaces of the two are drawn together, any displacement which may occur will be in the more readily moved and more readily moulded narrow marginal strip.

(b) The *depth of the wedge* should be in all cases sufficient to completely divide the tarsus. If the conjunctiva be penetrated in places, no harm results. The whole thickness of the tissue being divided, it is found that the conjunctiva and subconjunctival tissue are sufficiently loose or extensile to permit of considerable displacement as well as rotation of the lower segment of tarsus, which carries with it, of course, the border of the lid.

(c) The *breadth of the wedge* at its base depends largely on the degree of entropion existing. When the lower half of the tarsus is much thickened and bent, the rounded swelling of its anterior surface renders it imperative to remove a broader wedge than usual. But in some of the older cases of entropion, where the tarsus is much contracted vertically, the thickening involves the whole of it ; and the wedge may easily be made to include the greater portion of the tarsus. It is perhaps better in such cases to excise only a narrow strip, and to afterwards pare down the thickness of the upper piece of tarsus.

(2) Not only muscle, but a narrow *strip of skin* should be cut away in most cases, otherwise it is redundant afterwards.

(3) Three *simple sutures* properly inserted are much more effective than Snellen's sutures. The curved needle is to be introduced a little behind the most posterior lashes, wherever they may be situated (as in Green's operation), and passed obliquely forwards and upwards, to be brought out immediately above the lower

margin of the skin-wound. Thus, the more the trichiasis or distichiasis the further back will the point of entry be, and when the sutures are pulled upon, the more will the border of the lid be brought forward. The needle should then be passed into the anterior surface of the upper piece of tarsus well above the cut edge, and brought out again after taking a firm hold; neither skin nor muscle is taken up. By these sutures the lower tarsal segment, with the lid-border, is not only rotated forwards, but tends to be actually displaced on to the face of the upper segment. It is quite unnecessary to tie the sutures tightly; the parts require only to be retained in position, and not pulled forcibly into position by them. I have not had any sloughing of the lid-margin, but it must be very easy to produce it by tying the sutures tightly. The two end sutures of the three should be tied with a double hitch, as the parts are apt to be held in their original position by the lid-clamp. Two other sutures, passed through skin only, suffice to bring the edges of the skin-wound into close apposition.

The results of this operation are very satisfactory. One of its main advantages is its automatic adaptation to individual cases. Marked entropion brings its own remedy in the broader wedge taken, and troublesome trichiasis or distichiasis ensures an application of the sutures which increases the rotation of the lid-border. Inturned lashes close to the canthi constitute a difficulty, which can be overcome by moving the lid-clamp during the operation, so as to be able to incise practically the whole length of the tarsus. The cosmetic effect is perfect, and it is permanent except, possibly, where untreated trachoma leads to further cicatricial contraction. The slight shortening of the lid produced renders it, however, unsuitable for the few cases where there is already a shortened lid, whether from previous operation or otherwise. This

wedge operation has been performed by us at times for simple trichiasis and distichiasis, but though the result has been good, it is doubtful whether one is justified in removing tarsus when an equally good result may be got from simple division, or even without incising the tarsus at all, as in Hotz' operation.

The main defect of simple division of tarsus (with suturing) lies in the difficulty in gauging the ultimate result ; one has to overdo the immediate effect to allow for cicatricial shrinking. However, it permits of subsequent operation if necessary ; also the slight lengthening of lid produced is in some cases a good thing.

It may be broadly stated that for entropion, with or without trichiasis, no operation which leaves a deformed tarsus is complete. Arlt's operation is particularly faulty. In the first place, one meets with few eyelids in India for which the procedure is strictly applicable. Generally speaking, in splitting the lid, in order to cut up behind the inturned eyelashes, one must include some tarsus in the anterior layer ; one is then doing a Jaesche's operation, and the inclusion of the firm fibrous tissue prevents upward displacement of the lashes and the tissue in which they are embedded, unless lateral vertical incisions are added. One must choose between risk of recurrence or of deformity. In the Cowasjee Jehangir Ophthalmic Hospital, where lateral incisions were never made, there certainly were cases of recurrence. Operations for the implantation of mucous membrane or skin behind the inturned lashes are apt to produce a thickened lid-margin, and need care in the after-treatment.

Hotz' operation would appear to be the most strictly correct proceeding for pure trichiasis and distichiasis, where electrolysis is not sufficient ; simple division of tarsus for the slighter degrees, and removal of a tarsal wedge for the more marked examples of entropion.

UNUSUAL RESULT OF APPLYING HOMATROPINE TO THE EYE.

BY SYDNEY STEPHENSON.

OPHTHALMIC SURGEON TO THE EVELINA, TO QUEEN CHARLOTTE'S HOSPITAL, AND TO THE NORTH-EASTERN HOSPITAL FOR CHILDREN, &c.

EVERY ophthalmic surgeon knows that the local use of atropine occasionally gives rise in susceptible subjects to general disturbance, as shown by restlessness, delusions, delirium, and so forth. This untoward result, however, is rare. At the Ophthalmic School, at Hanwell, where atropine is used on an extensive scale as a preliminary to the systematic testing of refraction, marked general symptoms arise, on the average, about once only in 300 cases. Milder signs of atropinisation are nevertheless found to be common—that is to say, if the patients are watched closely. Thus, many children show a little mental dulness, and a curious dryness of the fauces denoted by a continual smacking of the lips. A slight rise in evening temperature is another sign of mild atropine poisoning, and so is a circumscribed flush over each malar bone. Until recently, I have never observed anything like general intoxication to follow the application of homatropine and cocaine (of each 2 per cent.) for the purpose of dilating the pupils or of paralysing the accommodation. The following is the case in point :—

A little girl, aged 3 years, suffering from trachoma and pannus, was admitted to the institution on March 24, 1899. On January 5, 1900, I wished to examine the cornea, and accordingly directed that the pupils should be dilated with the homatropine and cocaine mixture. Full mydriasis, however, was not attained until nine applications of the medicament had been

made in the course of ninety minutes. About three hours later, the ward-nurse found that the child was strange both in manner and in speech. She failed to recognise familiar faces, picked at the coverlet, tried to grasp invisible objects, babbled strangely, and persisted in getting out of bed. Her pupils were widely dilated, her face flushed, her lips and tongue parched. There was no eruption. Her temperature was 98.4° F. She passed water in her bed. During the night she dozed, spoke at random, and had delusions. In the morning, although much better, she was loquacious. But that gradually passed off, until within twenty-four hours of the administration of the mydriatic she was herself again, and has remained well since that time.

REVIEWS.

ABELSDORFF (Berlin). The Objective Proof of Colour-Blindness. *Archiv für Augenheilkunde*, xli., ii., 1900.

It would be of much advantage to us had we the means of testing and recording on an objective basis such a subjective problem as the amount of colour perception possessed by an individual, whether in a physiological or a pathological condition. Such an attempt is made by Abelsdorff, though not for the first time, for some half-a-dozen years ago Sachs suggested a plan for attaining this end. The earlier paper, however, has received but little notice, perhaps because the attempt was practically confined to a laboratory experiment.

It has been shown that, of lights of various colours, those whose apparent brightness was greatest gave the most active contraction of the pupil; thus of a red and green of equal "valency" the red appears brighter and causes more myosis. But since the value of a colour, in regard to its apparent

brightness, is not a constant but a variable element, the experiment becomes a little complicated. Thus an observer not at all colour-blind may find that under ordinary conditions a certain yellow gives rise to a much more active contraction of the pupil than a certain blue, while on reducing the brightness of such light, and shading the eye carefully for a considerable time before admitting the coloured light, quite the opposite holds good. And on still further reducing the light, so that neither colour is perceptible other than as a gray, blue (gray) appears brighter than yellow (gray), and again gives rise to a greater myosis. This leads us at once to the proposition that if, when the light is so reduced that a normal person becomes colour-blind, different "colours" set up differing degrees of pupil-contraction, it is quite possible that a similar occurrence will take place under more normal degrees of illumination in the case of a person congenitally colour-blind. According to the Hering theory of colour vision, all colours resolve themselves into a white and a colour element, of which red and yellow are the positive, green and blue the negative components. In a case, then, of complete red-green blindness, the white would only be mingled with blue and yellow, while in total colour-blindness the white alone would be present and all colour influence withdrawn. Sachs' idea was that in any case of colour-blindness, certain of the elements in perception being absent, there must be a lowering of the pupil-contracting power of light of a given strength; and we thus might have a basis for an objective test of the degree of deficiency, and indeed of its nature.

Abelsdorff's method of investigation was somewhat thus: In the wall of the dark chamber was a rectangular opening, through which the light of an electric lamp in the next room could be admitted. On the opposite wall was fixed a large white screen upon which the light, passing through the aperture, graduated and coloured by means of glasses as desired, was allowed to fall. The patient was seated in the dark room with his back to the aperture and facing the screen. The difficulty that

the degrees of illumination worked with were too slight to permit of proper examination, and comparison was overcome by means of careful lateral illumination by the aid of a small electric lamp, so constructed as not to allow any rays to reach the retina and thus to vitiate the results. The patient was desired to look at a small mark or test object in the middle of the screen. Before the aperture differently coloured glasses were caused to pass rapidly and the condition and movements of the pupil carefully noted; this was done either directly or by means of a telescope. On account of the multiplicity of circumstances which may affect the size of the pupil, it is necessary to repeat each experiment a number of times, in order to eliminate errors as far as possible.

Abelsdorff's experiments were performed in series, thus: A certain red and green, a certain red and yellow, a certain yellow and blue, were contrasted in pairs. The result in the majority of a number of normal persons was that in the first pair the red gave a smaller pupil than the green; in the second the red than the yellow; in the third the yellow than the blue. Patients with various abnormalities of colour perception were then tested with the same tinted glasses as had been used for the normal persons, but to the reviewer it does not appear that the results were very conclusive, for while certain of those who were undoubtedly colour-blind gave reactions different from the normal (*e.g.*, in Test I., the green caused more myosis than the red), yet in others who were as unmistakably colour-blind the results were precisely as in the average individual. It is interesting to note that in a case of typical hysterical colour-blindness the pupil reactions to the various lights were precisely as in the normal individual. This result, it may be mentioned, is entirely contradictory to that recorded by Sachs. On the whole, it does not seem that as yet much value can be attached to this mode of investigation, the uncertainty and the complications being still too serious, though the idea is a good one and more may come of it by-and-by.

W. G. S.

ADDARIO (Marburg). Anatomical and Bacteriological Investigations concerning Trachoma.
Archiv für Augenheilkunde, March, 1900.

Starting from the position that the trachoma granule is the basis of the disease, the papillary hypertrophy being a non-essential complication, this paper gives a minute description of the microscopical character of the granule in its growth, maturity, and decay. The descriptions are founded on sections cut in series from specimens fixed in sublimate, hardened in alcohol, and embedded in paraffin, then stained with iron hæmatoxylin. As is well known, a section through a developed granule shows a faintly stained interior with large cells, and a deeply stained border with small cells. The intimate structure is best displayed in a very small granule. One with a diameter of only 0.24 mm. is thus described:—The interior part with large cells occupies about two-thirds of the diameter; outside is a framework of connective tissue enclosing small lymphoid cells, identical in character with those of the surrounding adenoid tissue. There are also fixed cells belonging to the connective tissue itself. The large cells in the interior are themselves enclosed in a fine network of connective tissue continuous with the coarser framework of the periphery. The cells of the interior are mostly flattened and epithelioid looking, containing little protoplasm and a large granular nucleus. There is also a certain number of much larger cells with round or oval homogeneous nuclei, more or less in apposition with the connective tissue framework. In the protoplasm of some of these large cells, peculiar deeply staining bodies are seen, round in shape, or like a shell or cap, and always surrounded by a small clear zone. Apparently these large cells are identical with the "corpuscle cells" described by Leber, and are really nothing but overgrown connective tissue cells. The granule, then, consists of a connective tissue framework containing cells of two kinds—first, connective tissue cells, some normal, others undergoing various degrees of hypertrophy; secondly, lymphoid cells, some

large, others small. In fact, the granule is a lymphatic nodule, and is similar to those found in mucous membranes.

In specimens slightly larger, blood-vessels are seen. As the size of the nodule increases the connective tissue framework becomes obscured owing to the multiplication of cells. The size of the central part increases relatively to that of the border. Many of the lymph cells show division of their nuclei, the large connective tissue cells become more prominent and contain more of the "corpuscles," sometimes enclosed in one of a pair of nuclei. In this connection the author suggests that the "corpuscles" are nothing but the *débris* of nuclei once belonging to polynuclear cells, similar bodies having been found in the pyogenic membrane of chronic abscesses.

In a still later stage, the large connective tissue cells are found to have disappeared, their places being occupied by fluid. The "corpuscles" are still found, but are now free in the tissue. All the time that the granule is growing, it gradually approaches the epithelial surface, and finally bursts, discharging its fluid contents. A raw surface in the form of a crypt is the result. It assumes all the characters of a granulating surface, and gradually heals by second intention, resulting in the formation of scar tissue.

Trachoma, then, may be regarded as a chronic inflammatory process determined by a specific cause which acts from definite foci. It is characterised by the formation of lymph nodules, which, in consequence of partial necrosis and more or less complete evacuation of their contents, disappear, when an overgrowth of connective tissue, subsequently forming scar tissue, takes place in the adenoid layer of the mucous membrane.

The paper closes with a list of the micro-organisms found in connection with the granule, with some details of their cultivation.

A. HUGH THOMPSON.

A. OLLENDORF (Heidelberg). The Rôle of Micro-organisms in the Origin of Neuro-Paralytic Keratitis. *Archiv für Ophthalmologie*, xlix., 3.

IN this article, which extends to nearly sixty closely printed pages, are recounted the main results of an extensive series of laboratory experiments on rabbits, to elucidate and settle the point at issue. These experiments seem to have been most carefully planned and executed, but some of them are of a kind which many investigators would not care to imitate.

After division of the nervous trigeminus in rabbits, the eye being subsequently left unprotected, the author obtained the severe keratitic changes usually observed in these cases, and attributes them to injury followed by septic infection, the trauma giving a point of entrance to the organism which cannot penetrate the normal epithelium. In order to protect the eye from injury the experimenter in some cases used the method of half suspending or slinging the rabbits, so that they could move about a little but could not do their eyes any injury. In this way he kept rabbits alive as long as twenty-three days after division of the fifth, the eye being all the time protected from injury. In these cases he obtained desiccation and infiltration of the cornea, but never an affection of the deeper parts, *e.g.*, iritis or hypopyon. To decide whether desiccation *per se* is sufficient to give the inflammatory changes observed, the experimenter now sets himself to produce a pure "desiccation keratitis." To effect this he divided the facial, excised the nictitating membrane and made an artificial ectropion of both eyelids. The keratitis thus obtained corresponded to the neuro-paralytic form obtained by division of the fifth. To prevent access of organisms and yet obtain a satisfactory desiccation was the great difficulty, and this the observer claims to have accomplished by dislocating the globe forwards and fixing it in this position by suturing the lids. In this way the cornea and a large part of the sclera were kept exposed, and desiccation and keratitic changes very rapidly induced, *viz.*, in twelve to twenty-four hours.

In these cases he found no organisms, and considers the desiccation the essential factor in producing the keratitis. In regard to these last experiments it appears, however, that the desiccation involves so much of the globe as seriously to have interfered with its nutrition and blood supply, the author indeed, speaking of a necrosis of part of the sclera.

The following is a digest of the experimenter's summary of his results:—

(1) The ordinary corneal inflammation seen after division of the fifth nerve is due to trauma, *plus* septic organisms.

(2) On the other hand, if the eye is protected from injury the essential factor in the causation of the keratitis is the desiccation, which, as shown by experiment, is in itself sufficient to cause the inflammatory changes observed.

(3) One may not argue that what happens in the case of the rabbit will necessarily happen to man, without further investigation. No doubt most cases of neuro-paralytic keratitis observed in man are due to injury, *plus* septic infection.

(4) Any vaso-motor disturbances caused by division of the fifth have no bearing on the origin of the keratitis.

In the course of the article the views and results of other investigators are concisely stated and discussed, and the author adds a copious catalogue of literary references which should be very useful to any one devoting special attention to the subject.

J. V. PATERSON.

L. BACH (Würzburg). Further Investigations into the Nuclei of the Nerves of the Eye Muscles. *v. Graefe's Archiv für Ophthalmologie*, xlix., 2 and 3.

The first part of this paper gives the results of the examination of the brain of a man whose left eyeball had been atrophied for many years, and whose right eye had suffered from adherent leucoma and secondary glaucoma

followed by excavation of the disc and atrophy of the optic nerve.

In the second part the examination of the nuclei of the third and fourth nerves of the monkey, cat, rabbit, mouse, fish, lizard and various birds is described.

The author comes to the following conclusions :—

The forms of the nucleus of the trochlearis are round or ovoid. The nucleus is in close contact with the dorsal margin of the posterior longitudinal fascicle. The fibres which emanate dorso-laterally from this nucleus undergo in the velum an apparently complete decussation. The upper wall of the aqueduct is partly formed by the decussating fibres of the trochlearis. The nucleus of the trochlearis is the peripheral continuation of the nucleus of the third nerve. These two nuclei are most likely not separated from each other as a rule by a zone that is free from cells, but only by one in which the cells are less numerous.

The nucleus of the third nerve varies somewhat in its form, and shows in the different animals mentioned (including man) a series of similar features, but also some marked differences. Very noteworthy is the well established fact that no definite division exists in the sense of the hypothesis of nuclear paralyses. In all cases it was found that the nuclear area partially adjoins the dorsal margin of the posterior longitudinal fascicle, and that the angle between the longitudinal fascicles becomes filled with cells only gradually in a centripetal direction. Some of the motor cells are situated between and outside the transverse sections of the longitudinal fascicles. Part of the oculomotor fibres emanating from the nuclear area do not decussate, while another part, especially the peripheral fibres, decussate.

The form of the nucleus and the arrangements of the fibres are very similar in man, monkey, cat, mouse and rabbit, but different from those in birds, in the lizard and the fish. In these latter a great portion of the nucleus is situated ventrally in the transverse sections of the longitudinal fascicle.

According to Bernheimer, the small-cell nuclei of Edinger-Westphal are present in the same way in the monkey as in man, but they are absent in the rabbit. Bernheimer considers this non-existence in the rabbit to be due to the lateral position of the eyes, to the absence of convergence, and to the defective pupillary reaction. The author thinks this could only account for a poorer development but not a complete absence of those nuclei. He further states that, with regard to the small-cell nuclei of Edinger-Westphal, he has found cells of the same type and the same varying forms, in the very locality of those nuclei, in the monkey, the cat, the rabbit and the pigeon. His observations are particularly made on excellent series treated with thionin and toluidin-blue. He mentions further that in his series the cells are less densely packed in the monkey, rabbit and pigeon than in man and in the cat.

Cells of the type of the Edinger-Westphal group are also found sporadically within the area of a transverse section of the longitudinal fascicles, in the whole internuclear space, and to a wide extent dorsally and laterally of the nuclei of the third and fourth nerves.

A distinct formation of the so-called central nucleus of Perlia could not be found in any of the animals mentioned.

The author is in doubt whether the dorso-medial and dorso-lateral cell group in the bird corresponds to the Edinger-Westphal groups in man; if it does, the large number of cells is unintelligible, for the sphincter pupillæ, though well developed in birds, would not require such a number of cells. Moreover, the type of the cells is different from that of the motor cells of the main nucleus, and yet the sphincter pupillæ in birds is a striated muscle whose fibres—at least in the author's specimens—are scarcely different from those of the other striated muscles of the same bird.

The mouse, with a feebly developed sphincter pupillæ, has a very pronounced small-celled dorso-medial and dorso-lateral nucleus, but Perlia's central nucleus is completely absent.

For these and other reasons given in detail the author comes to the conclusion that Bernheimer is most probably wrong when he thinks that the sphincter pupillæ is innervated by the small-celled Edinger-Westphal groups, and the ciliary muscle by the large-celled central nucleus of Perlia; he thinks it more probable that, if any connection exists between the internal muscles and these cell-groups, both muscles are supplied by either the one or the other group.

With regard to the posterior longitudinal fascicle, the author feels justified in concluding with a great amount of probability that large numbers of its fibres end in the nuclear region of the ocular muscles, and that they are principally concerned in the transmission of sensory impulses.

Clinical observations have led for some time to the belief that the nuclei of the internal eye muscles are situated in close proximity to each other, but somewhat separated from the nuclei of the other eye muscles, the latter being assumed to be placed more superficially than the former.

The anatomical examinations, however, made by several investigators have shown of late that any separation of the oculomotor nucleus into a number of subdivisions is not admissible. It has been found that the cells belonging to the external muscles are not sharply separated from each other; and it is most probable that the same is the case with the cells of the internal muscles, viz., that they lie close to or are even intermixed with the cells of the external muscles, especially with those of the internal rectus. The author gives a *résumé* of the results of the various experimental and anatomical investigations, according to which Hensen and Voelkers locate the cells of the internal muscles in the anterior part of the nucleus of the third nerve, while Adamük placed them in the posterior part. Bernheimer produced isolated contractions of the external eye muscles, and also of the pupil, by stimulating with weak electric currents the various parts of the nucleus of the third nerve.

Kahler and Pick place the pupillary fibres of the third

nerve in man in the anterior root fascicle of the nucleus; Westphal seeks the innervation of the internal muscles in the small-celled groups of the anterior portion of the nucleus.

Jacob localises the ciliary muscle very far forward in the nucleus, and considers it as widely separated from the pupillary sphincter fibres.

Kaiser also places the internal muscle cells in the anterior part of the nucleus. Neither he nor Monakow thinks the Edinger-Westphal cell-group to be that of the internal eye muscles.

According to Michel's hypothesis, the neuron of the nerve fibres of the non-striated internal muscles commences only in the ciliary ganglion and not in the nucleus of the third nerve. This hypothesis has been borne out by experiments, such as evisceration of the eyeball, on animals with non-striated internal muscles, after which no changes occurred such as would suggest a localisation of the internal muscles in the third nucleus. The author therefore undertook a series of experiments on the pigeon in which, as in birds generally, the internal eye muscles are striated, and found that after evisceration of the eyeball degenerative changes took place in the third nucleus, mainly in its ventral (middle) part. These altered cells are intermixed with the normal, unchanged cells, and do not occupy a separate region; the small-celled nuclei of Edinger showed no alteration whatever.

From the experiments of the various observers, it seems to be an established fact that in the rabbit the cells of the inferior and internal rectus are situated in the proximal part of the nucleus, and that the cells of those muscles that are functionally connected lie close together in the nucleus, though without any marked separation from the cells of the other muscles. The author inclines to the view that also in man the cells of the internal muscles as well as those of the internal rectus are situated in the proximal portion of the nucleus.

K. G.

MORGANO (Catania). Recurrent Paralysis of the Third Nerve. *Annali di Ottalmologia*, xxix., 1, 1900.

Up till comparatively recently two forms of hemicrania were recognised, simple hemicrania, and hemicrania ophthalmica, but in 1890 Charcot described a third form which he named hemicrania ophthalmoplegica, of which the chief symptoms are: general malaise, accompanied at times by such gastric disturbances as nausea and vomiting; intense neuralgia, followed by paralysis of the third nerve with its consequences of strabismus, ptosis, mydriasis, &c.; then recovery from the paralysis followed by its reappearance after an interval of time. This paralysis of the third nerve may come on all at once, or more slowly and progressively, but in whichever manner it appears, three characters are always present, viz., all the branches are involved, the ophthalmoplegia is both internal and external; the affection is limited to that one nerve; the recurring attacks always affect the same nerve. Morgano does not apparently mean to imply that such cases were unknown before Charcot described the condition, for the first case seems to have been published in 1860, but it has been better recognised since Charcot's day, and it was he who differentiated it from the other forms and gave it its name.

Morgano gives interesting details of a case which he has at present under observation, and which he has watched for three years. It is that of a young woman, C. V., a laundress, aged 17. At the time when the patient first came under observation, her mother had just died suddenly from some nervous disease, the father was 72 years of age, in good health, but an immoderate drinker, one sister and two older brothers were in good health also, but another sister, married and with three sons, had from her eighteenth year suffered from epilepsy. The patient had scarlet fever when a child; she has nebulæ of the cornea, as the result of ulceration in childhood, for the relief of which an optical iridectomy has been done in the right eye. Putting aside these unimportant matters, she has enjoyed perfect health, with the important exception that at the onset of puberty, and first menstruation when 14 years of age, she was

attacked by very severe headaches; these headaches returned at each period; the flow was scanty and pale, and often in fact absent altogether. At the time of the mother's death she was for the first time attacked by hystero-epilepsy, convulsions of which have since then returned with considerable frequency. She first came under notice on account of violent tearing pains in and about the right eye, radiating to the forehead, temple, and nape of the neck; at the same time there was marked ptosis, any effort to overcome which was attended with much pain; there was also much tenderness to touch. The patient was at the time evidently in a highly nervous condition, trembling, and complaining of pain in the head and precordial region, but there was no evidence of any other actual lesion. In two days the condition of affairs had greatly improved; the upper lid still hung down a little, but not to the former degree, and except for the internal rectus which was still somewhat affected, all the muscles had recovered their function. At this time she had missed two menstrual periods, a fact which she attributed to the distress and alarm consequent upon her mother's sudden death, this occurrence having exactly coincided with the time at which a period was due. She remained quite well till five weeks later, when she reappeared with the former symptoms reproduced; the onset had been coincident with the—very imperfect—menstruation. The hystero-epileptic fits also returned, but again after three days' treatment as before with bromide and antipyrin she entirely recovered. Two months later the whole programme was gone through again. On a subsequent occasion, when Morgano saw the patient suffering from a more severe and more painful attack than any which had preceded it, he found that for three months menstruation had been absent and she had remained quite well, but the flow having again begun all the old train of symptoms had followed also. On admission to hospital she was found to have partial paralysis of her lower limbs with diminished sensation, and the physicians in charge, regarding the case as one of grave hysteria with functional

paralysis of the lower limbs, proceeded to treat her by means of suggestion, electricity, and hydro-therapeutics; ovarian extract was also administered and arseniate of iron. In six weeks she was quite well again, but for the first three months after at each return of the menses the old paralysis came back, along with fits and anæsthesia and hyperæsthesia in various areas. Gradually she recovered, however, under good feeding and a tranquil mode of life, and with the return of better health the whole symptoms passed off.

We have reproduced from Morgano's paper the above abridged account of the patient's illness, since these cases are so very uncommon. As regards the etiology, there are several different views, as indeed might be expected in a condition such as this, some holding that there is a basal lesion, others that its site is in the nuclei of the third nerve, others that it is cortical, others that it is a true hemicrania, the vascular disturbances connected with which have affected the blood supply of the trunk of the third nerve; others that it is a peripheral neuritis, others that it has its origin in the cerebellum. To each and all of these theories there are, as the author says, certain objections, and the true pathology is not yet definitely known.

In the case in hand certain points stand out as important, viz., the neuropathic heredity, and the highly hysterical condition of the patient herself, the occurrence of hysterical convulsions before the onset of the paralysis, and then the coincidence of these two; the marked relationship between menstruation and the attacks, the complete recovery of the third nerve from its condition of paralysis between the attacks in spite of their frequency and severity, and the disappearance of the malady altogether under ovarian treatment as the regularity of the menses returned and as the general bodily condition became better. In regard to the first of these facts it should be noted that various other nerve lesions had in a large proportion of the recorded cases been present in the relatives of the patients, and as concerns the patients themselves, mental and other neuroses are also very frequently to be found. Some relation, more

or less close, to menstruation has also been noted in a large number of the published records.

Acting on the principle that when there is physiological hyperæmia of one part there is probably anæmia of another, and inverting this rule, Morgano expresses himself in favour of the theory that, taking it for granted that the hystero-epileptic fits were due to a localised anæmia of part of the hemispheres, this anæmia had induced a coincident hyperæmia of the third nerve, either at its nuclei or of the trunk of the nerve, resulting in its temporary paralysis. To the very natural objection which one may have to this suggestion, in that, among other matters, we do not observe any analogous train of circumstances elsewhere in the body, he replies that it is only in the brain, and perhaps in the cerebellum alone by reason of its extreme delicacy of function, that one could expect to see it, so that the objection can hardly hold good.

W. G. S.

E. JACKSON (Denver, U. S.) *Diseases of the Eye.* W. B. Saunders, Philadelphia, 1900.

It is impossible in this place to criticise a book written by one of the Editors; we merely notice that it has been published, and that while in this country it has many competitors for public favour, it has no need that apologies be made for it. The plan of the work is clear, the various subjects being grouped in suitable chapters; the illustrations are numerous and effective; the subject of defects of refraction and their detection occupies, as might be expected in a work by this author, a considerable amount of space. A special chapter is devoted to ocular symptoms in general disease.

STEPHENSON. *Contagious Ophthalmia.* London, Ballière, Tindall, & Cox, 1900.

This little work appears to be the first of a series of medical monographs on various subjects, and its aim is to discuss in an efficient way and yet in small compass the

main facts regarding the different forms of contagious ophthalmia. It begins with a description of the points in the examination of the affected eye generally, but more especially in the bacteriological investigation of its discharges, for the conduct of which careful and precise directions are given. Next the various forms, first of acute and then of chronic conjunctivitis are described, and the methods of detection and recognition of the germ causing each is thoroughly detailed, including the mention of the best stains and the most suitable culture media. The author differs from some others in saying that the Klebs-Loeffler bacillus can always be diagnosed from certain others whose general characters are precisely similar, and he avoids the difficulties involved in its presence even in the normal sac by saying that it seems to be unable to produce its characteristic results except in the presence of certain conditions of which we know little at present. His view is that, if this organism is present in a case of conjunctivitis, the case is one of diphtheria, although the external appearances may be against this diagnosis. But if, as has been asserted by some, this organism is a frequent inhabitant of the conjunctival sac, how are we to be certain that an inflammation in its presence is diphtherial?

The author is to be congratulated upon a handbook ably and well prepared; we should have thought a page might very well have been given to the bacteriology of the normal sac, since the whole subject is looked at from an almost purely bacterial standpoint. So much is this the case that the author commits the not infrequent error of supposing that the pre-antiseptic practitioner's standard of knowledge was much lower than in reality it was. Men made fewer errors than Mr. Stephenson seems to think before they ever heard of the gonococcus or agar-agar or Gram's method. The weakest point is the diagrams; these are extremely crude.

CLINICAL NOTES.

THE ANATOMICAL CONDITIONS OF DETACHMENT OF THE RETINA IN BRIGHT'S DISEASE.—Goldzieher has had the opportunity of examining the eye from a patient who died of chronic nephritis. During life the characteristic appearances of albuminuric retinitis had been noted, and in the right eye the signs of an intense œdema of the retina, with a well marked cherry-red spot at the macula. Examination of sections of the whole eyeball, after death, disclosed the characteristic changes of retinitis albuminurica; sclerosis of the retinal vessels, leading in some to complete occlusion; numerous hæmorrhages in the retina and œdema of this tunic, which, though most marked in the central part, were noticeable even at the extreme periphery; at the ora serrata cystic dilatations of the retina were present. In many parts, especially around the papilla, the retina was enormously thickened, and there were many spaces in it, filled by coagulated fibrinous exudation. In places it was easily shown that the exudation had broken through the membrana limitans externa, forced its way between the rods and cones, and separated and pushed back the pigment cell layer. In the whole of the central portion of the retina, where the œdema had been most visible on ophthalmoscopic examination, exudation had accumulated in masses between the bacillary layer and the hexagonal pigment layer, separating them widely from each other. Study of the microscopic specimens showed very clearly the connection between the retro-retinal fluid and the œdema of the retina, and left no doubt that the detachment was the result of the penetration of the exudation between the retina and its pigment epithelium. The vitreous was quite free from fibrous degeneration, which might have exerted traction upon the retina.—Goldzieher, *Die Ophthalmolog. Klinik*, February 20, 1900.

INSOMNIA CAUSED BY REFRACTIVE ERRORS.—Trousseau has been struck with the fact that he has met with a certain number of patients suffering from insomnia in

whom this sleeplessness was apparently due to an error of refraction, and passed off on its correction. The first instance which originally drew his attention to this unlikely cause was that of a youth, aged 17, who had been studying hard, but who at last failed to obtain more than about a couple of hours of sleep at night. He was hypermetropic to the extent of 2.5D., and on correction of this his insomnia passed away completely. The restrictions in diet, conduct, and work-hours, which had previously been enjoined, and the hypnotics which had been unavailingly given, were now all withdrawn, but if the lad continued through the day to wear his glasses he was sure of a good night's rest. Since then Trousseau has seen several other cases.—*Archives d'Ophthalmologie*, June, 1900.

GLAUCOMATOUS IRITIS.—Occasionally a case of iritis occurs in which the tension is found to be increased and in which use of atropin is on this account attended with some risk of further evil, while if one withholds the mydriatic he is apt to be a mere spectator of the formation of disastrous synechiæ. Wagner of Odessa relates, at considerable length, an instance of such a condition. Briefly, it was that of a man who for a number of years had suffered almost yearly from acute iritis of one or other eye; the attacks were attended with much pain, with increased tension, and with copious, semi-opaque exudation into the anterior chamber; treatment of the ordinary type did not materially alter the course of the disease, and though for a long time each attack appears to have been entirely recovered from, yet in process of time as the recurrences multiplied vision had been distinctly degenerating. A paracentesis in one eye and an iridectomy in the other seemed to reduce the severity, if not the frequency, also of the successive attacks, and the use of a myotic, in spite of the risk of promoting unwelcome adhesions, undoubtedly not merely greatly relieved the acute symptoms, but also assisted largely to prevent recurrences.—*Centralblatt für Augenheilkunde*, February, 1900.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JUNE 14, 1900.

G. ANDERSON CRITCHETT, M.A., F.R.C.S.Edin., President,
in the Chair.

Obstruction of both Central Arteries of the Retina.—Mr. W. H. Jessop related a case in which the central artery, first in the right eye, then in the left, became suddenly obstructed with the symptoms (cherry-red spot, &c.) typical of embolism, at an interval of two months. The patient was a married woman of 35, who had had one miscarriage, and one child who had barely survived birth; no living children. No history of illness, except influenza and an attack of epistaxis, which had lasted some weeks. All the signs of embolism were present in both eyes, and in addition there was thickening of the outer coat of the arteries in places. This was especially noteworthy because periarteritis was generally secondary to disease of the internal coats. In the first eye, vision was at first reduced to doubtful P.L., but subsequently improved to $\frac{6}{35}$. In the second eye there was no P.L. Treatment had been by mercury internally and by inunction. Considering that there was no demonstrable source of embolus, and the extreme improbability of such an artery as the central artery of the retina being picked out twice while no embolus occurred elsewhere, he thought embolism improbable in spite of the suddenness with which the blindness in each eye had occurred. He attached great importance to the evidence of arterial disease, and considered that the case was probably syphilitic in origin.

Mr. Treacher Collins mentioned a case he had shown in 1897, that of a young woman of 19, who had the so-called classical symptoms of embolism, at an interval of eighteen months, in each eye. She suffered from amenorrhœa, and for a year previous to the attack in the second eye had been subject to daily attacks of epistaxis, which had stopped a few days before the eyes were attacked, and did not recur. Good central vision was retained in one eye and some peripheral vision in the other, so that with the two together she saw fairly well. He attributed the case to hæmorrhage into the optic-nerve sheath and suggested that Mr. Jessop's case, where also there had been epistaxis, might be due to this cause.

Dr. Abercrombie reminded the Society of Mr. Priestley Smith's published cases of spasm of the retinal artery in connection with uterine disease.

Periarteritis of the Central Artery of the Retina.—Mr. Simeon Snell related the case of a woman of 43, whose right eye had been failing for four months when he saw her. The arteries on the disc, and for about a disc's diameter beyond, were enveloped in sheaths "snow-white and somewhat glistening." The sheath on one of the large arteries came to an end gradually, being continued further on the posterior aspect of the vessel. There was only one small hæmorrhage and the veins were not affected. Vision was $\frac{1}{60}$, not improved by any correction. In the other (left) eye a similar condition was noted as commencing, but very much less marked; vision was $\frac{6}{9}$. The patient had a small quantity of albumen and granular casts in her urine, and a hypertrophied left ventricle. A similar case had been recorded by Mules in Vol. 11. of the *Transactions*, but he did not know of any more recent case.

The Arithmetical Triangle in Ophthalmology.—Mr. C. Wray read this paper, the object of which was to determine the relative frequency of the various degrees of ametropia on *a priori* grounds, reasoning from the doctrine of chances. The result, according to the author, agreed more or less with facts observed and tended to allay anxiety as to the gradual increase of refraction in the eyes of mankind. This view was further supported by the want of evidence that acquired characteristics are inherited. This paper was of a very abstruse character and elicited no discussion.

Ophthalmitis associated with Basal Meningitis.—Mr. S. Stephenson read notes of this case, which were illustrated by specimens and slides. A child, aged seven months, was in hospital for four weeks with posterior basic meningitis. On the first examination, five days from the onset of acute symptoms, the anterior chamber of one eye was full of greyish-white flocculent exudation. At the autopsy four weeks later, the eye was in a state of panophthalmitis, the medulla and adjacent parts of the brain were covered with a mass of gelatinous lympho-pus, and he had been able to trace definite inflammatory changes all the way between the two, along the chiasma and left optic nerve down to the swollen papilla, a section of which was shown. In the exudation at the base of the brain a micrococcus was found and cultivated, which "corresponded closely to the description given of the meningo-coccus of Weichselbaum, now known to be the cause of cerebro-spinal meningitis." Whether the coccus was actually Weichselbaum's or that described by Still as associated with posterior basic meningitis, the author left an open question. He had been unable to discover the coccus in the eye

itself, but thought that if the early hypopyon had been examined he might have been more successful, and suggested that in cases when the diagnosis was doubtful this procedure might be employed.

Card Specimens.—Mr. Juler: Retinal detachment.—Intraocular growth.

The patient was a man, aged 60. A central detachment involved the whole of the macula, its apex being visible with + 12 D. There were numerous hæmorrhages on its surface, and towards its outer side (?) choroidal vessels could be seen.

Mr. Holmes Spicer mentioned a somewhat similar case in which puncture of the detachment had been performed with the aid of the ophthalmoscope.

Mr. J. Griffith thought there was no doubt that it was a sarcoma, and Mr. Juler agreed.

Mr. J. Rowan: Sections of the healing stump of an optic nerve four days after enucleation.

Mr. J. Hern: A very severe case of essential shrinking of the conjunctiva in which operative measures had been tried without avail.

On Friday, June 15, at a special meeting of the Society, Mr. Marcus Gunn delivered the Bowman Lecture "On Visual Sensation"

FRENCH SOCIETY OF OPHTHALMOLOGY.

MARCH 6, 1900.

A Case of Gangrenous Pericystitis and Anaerobic Suppurations.—MM. A. Veillon and V. Morax. Having pointed out the essential differences between suppuration and gangrene, and the rarity of finding fœtid pus in suppurations affecting the lacrimal passages, MM. Veillon and Morax drew attention to the following case:—

Mlle. A. Houd, 32 years of age, had suffered in November, 1897, from an attack of conjunctivitis of the right eye, with marked lacrimation, though (according to a colleague) the nasal duct was permeable. On March 5, 1899, her right eye became slightly inflamed and some discharge appeared. On March 9, the eyelids became greatly swollen, severe pain in the nose and right cheek occurred, and the patient experienced considerable constitutional disturbance—insomnia, fever, complete loss of appetite, &c., but no headache. This lasted until March 11, when the purulent

collection in the region of the lacrimal sac opened externally and some pus escaped. She was then seen for the first time by MM. Veillon and Morax. Pressure on the lacrimal sac caused a free discharge of grey, peculiarly fœtid pus: her eyelids were hard, œdematous, and painful; her appearance suggested a great deal of constitutional disturbance. There were two fistulæ, one above and one below the tendon of the orbicularis. From the upper one a greyish slough was extracted by forceps after irrigation of the cavity. A No. 2 style was passed by the lower fistula, and only a slight stenosis was found at the upper end of the nasal duct. By the end of March the patient seemed to have quite recovered, but in April two exostoses appeared, which rendered the passage of the style difficult. They had gone in seven weeks. In October, 1899, the patient was seen again, and was quite well.

A bacteriological and microscopical examination of the pus was made.

Microscopically, three different kinds of microbes were found:—first, cocci, two by two or in short chains; second, cocco-bacilli, also in short chains; third, bacilli in various shapes which stained badly. The streptococci and the cocco-bacilli remained stained with Gram, the bacilli were completely decolourised.

Bacteriologically, cultures were made for aerobic and anaerobic microbes, and three kinds were found:—(1) An aerobic streptococcus having the characters of the ordinary *Streptococcus pyogenes*. (2) A bacillus which developed only in tubes deprived of air. This took many shapes, stained badly, and was completely decolourised by Gram. The cultures of it grew as punctate colonies in agar, grey or yellowish in colour, scarcely visible to the naked eye, and giving off a fœtid odour, but no gas. Inoculated in guinea-pigs and rabbits, abscesses and sloughing of the skin followed. Some of the animals died, others recovered if the abscess was opened. This bacillus was identified as the *Bacillus infundibuliformis*, as it was named by Hallé, who found it always in gangrenous or putrid cases. (3) A cocco-bacillus which does not seem to have been described and has not been thoroughly investigated. It was strictly anaerobic, and generally appeared in the shape of short rods two by two or in masses. The cultures formed small, round, opaque, grey colonies, not giving off gas in any appreciable quantity, but causing a fœtid odour.

The two anaerobic microbes were more abundant than the aerobic streptococcus, and to this fact may be ascribed the gangrenous and fœtid character of the lacrimal affection.

M. Galezowski was of opinion that suppuration with fœtid pus in such cases was usually caused by *maladroit* sounding of

the lacrimal passages, or was due to blennorrhagic ophthalmia (as in two cases of his own). By the use of large conical sounds one more easily re-established the permeability of the lacrimal passages and so avoided the formation of fistulæ.

M. Sulzer thought that the majority of cases of phlegmonous or gangrenous lacrimal pericystitis were only seen when the pericystitis had already formed, and consequently could not be so definitely attributed to *maladroit* sounding.

M. Morax, in reply, said that the first indication for treatment was to re-establish the permeability of the nasal duct by sounding, and then to syringe out the abscess cavity. He had never observed blennorrhagic infection of the lacrimal mucous membrane.

Ocular Analgesics and, in particular, Dionine.—M. A. Darier: While we have local anæsthetics such as cocaine, holocaine, eucaine, &c., of undoubted power, still their effect is but transitory, and we need one of more lasting duration. Orthoform and acoine fulfil to some extent this indication, but M. Darier thinks dionine is better than any. Dionine¹ is a derivative of morphia, to which attention has been already called (*La Clinique Ophtalmologique*, No. 23, 1899). Wolffberg attributes to it a lymphagogue action, but does not insist particularly on its analgesic properties.

On placing a fragment of dionine of the size of a pin's head in the conjunctival sac, the first effect is a sharp stinging pain followed by numbness of the eye, very marked chemosis and sometimes œdema of the lids with impaired mobility of the globe. The pupil as a rule rapidly dilates even if atropin had previously failed to make it do so.

The patients who benefited most from the application of dionine were those suffering from iritis (especially of the relapsing rheumatic type), vascular keratitis with intense photophobia, or parenchymatous keratitis (whether from hereditary syphilis or trauma). The dionine in all the cases reported by M. Darier (working in conjunction with M. Daulnoy) alleviated the pain and rendered the eye numb.

Regarding the other alkaloids derived from morphia (*e.g.*, peronine and heroine²), M. Darier could not speak well; he had tried them and found them wanting. Over morphia itself dionine has the great advantage that it never gives rise to constitutional disturbances. The exact way in which dionine brings about its analgesic effect is unknown. According to Buffalini and Wolffberg,

¹ See OPTHALMIC REVIEW, 1900, p. 148.

² *Ibid.*, p. 145.

peronine and dionine both render the cornea anæsthetic, but M. Davier disputes this, saying that it does not suppress feeling, but it does suppress pain. The lymphatic stasis, manifested by the chemosis (sometimes exceedingly marked), appears to have some part in the mechanism. This œdematous fluid may absorb by osmosis enough of the alkaloid to render the sensitive nerve-endings insensitive to pain. Or perhaps by absorption into the general system from the conjunctiva it may act on the general nervous apparatus. Against this latter hypothesis is the fact that if both eyes are painful, only that one in which the dionine has been placed is rendered painless.

M. Jocqs bore testimony to the wonderful effect of dionine in a case of acute iritis to which M. Darier had alluded.

M. Darier, in reply to several questions, said that the amount of dionine put into the conjunctival sac varied from 2 to 4 milligrammes. The chemosis varied in amount, sometimes being all over the globe, sometimes only at the point of application. The intra-ocular tension was notably lowered. Sub-conjunctival injection, he thought, would be the most exact way of administering it.

Blennorrhagic Dacryoadenitis.—M. A. Terson: The interest in this case lay in the fact that the patient, who was still suffering from gonorrhœal discharge, manifested no other general disturbance nor any articular complications. The lacrimal gland on both sides was much enlarged (more particularly on right) and caused the characteristic swelling of the outer third of the upper lid. There was no other ocular complication save a slight œdema of the upper lid and some lachrimation (contrary to the dryness of the eye which has characterised some cases of dacryoadenitis). The enlargement soon disappeared under simple remedies.

M. Dreyer-Dufer quoted a case of his own of monocular acute dacryoadenitis in a patient who was suffering from membranous conjunctivitis. The enlargement of the gland lasted for about two months.

M. Jocqs mentioned a case in which suppression of milk from severe emotional disturbance appeared to cause in a nursing woman an enlargement of both lacrimal glands with marked dryness of the conjunctiva.

M. A. Terson, in reply, said that he looked on the case in much the same light as those of iritis or other metastatic complications of gonorrhœa. He thought it would be very difficult to isolate the gonococcus in such cases.

FRANK C. CRAWLEY.

THE EXTERNAL OCULAR MUSCLES AS CO-ORDINATES OF ACCOMMODATION.

BY W. M. BEAUMONT.

SURGEON TO THE EYE INFIRMARY, BATH.

THE Eye is a self-adjusting optical instrument with a capacity for seeing objects clearly at varying distances. This capacity for focusing, that is accommodation, is a subject that has always interested ophthalmic surgeons, and our gratitude is especially due, amongst others, to Thomas Young in England, to Helmholtz in Germany, and to Tscherning in France, for having made clear by their researches much which was formerly obscure. That the ciliary muscle is the source of accommodation no one now doubts, but the possibility of some adjuvant power is not generally allowed.

My attention has been attracted to the following facts as regards vision :

In order to examine the static refraction of 127 cases of hypermetropia, in which the error did not exceed 2 D., the accommodation was paralysed by an instillation of two drops of solution of atropine (gr. iv. ad ʒj.) three times a day for three days. Then putting the patient in front of the test types at a distance of 6 m., I found the average vision to be as follows, omitting fractions :—

TABLE I.

Average vision of hypermetropes with paralysed accommodation and without glasses :

Amount of Error.								Vision.
+ 0.50	...	...	...	...	...	...	...	$\frac{6}{7}$
+ 0.75	...	...	...	...	...	...	...	$\frac{6}{10}$
+ 1.0	...	...	...	...	...	...	...	$\frac{6}{12}$
+ 1.25	...	...	...	...	...	...	...	$\frac{6}{13}$
+ 1.50	...	...	...	...	...	...	...	$\frac{6}{15}$
+ 1.75	...	...	...	...	...	...	...	$\frac{6}{50}$
+ 2.0	...	...	...	...	...	...	...	$\frac{6}{33}$

Of the 127 cases examined there were 54 in which the amount of error was 1 D. as demonstrated by the test types and lenses (under atropine) and confirmed by ophthalmoscopic examination.

TABLE II.

Vision of 54 patients with 1 D. of H. (accommodation paralysed) :

Number of Cases.								Vision.
4	...	...	...	...	...	...	...	$\frac{6}{6}$
16	...	...	...	...	...	...	...	$\frac{6}{6}$
18	...	...	...	...	...	...	...	$\frac{6}{12}$
14	...	...	...	...	...	...	...	$\frac{6}{12}$
2	...	...	...	...	...	...	...	$\frac{6}{24}$

In all these cases a + 1 D. lens brought the vision up to $\frac{6}{6}$, in some of them to $\frac{6}{5}$, and a few could read some letters of $\frac{6}{4}$; but there was found to be no tendency in those with the better vision without a lens to be the better sighted eyes when a lens was put in front of them. For instance, one of the cases in which the vision was equal to some letters of $\frac{6}{6}$ without a lens could not be improved beyond $\frac{6}{6}$ when a + 1 lens was put in the trial frame, whereas one of the patients who could only read $\frac{6}{24}$ without a lens could read clearly $\frac{6}{5}$ with the lens.

Here, then, are 54 patients with one diopetre of hypermetropia, that is, who with a lens of that power and paralysed accommodation could all read $\frac{6}{6}$, and

whom no other lens suited so well—remove the glass and they do not see equally badly. What is the element that causes the difference, accommodation being excluded? Let us take an imaginary hypermetrope with one dioptré of error but having perfect media, with no disease, in whom with paralysed accommodation and a $+1$ lens vision equals $\frac{6}{6}$. Let us also take a well-made photographic camera in which distant objects are focused exactly on the screen, then place a -1 D. in front of its lens or reduce its refracting power by a dioptré. We now have two optical instruments which may be fairly compared with each other: first, the natural; second, the artificial. In each case increase the refractive power and we theoretically get a perfect picture, in the first place on the retina, in the second, on the screen. Without the lens in each case we get a blurred image, and in any similar eyes or cameras with equal-sized pupils or apertures we should theoretically expect to get a like amount of blurring whenever a $+1$ lens was required before the object was focused. In each case, too, if we increase the amount of hypermetropia we increase the amount of blurring. It follows that if we could by any means measure the amount of blurring we ought to be able to deduce the refractive error in any given case. Now in the human case we can to some extent estimate the amount of blurring, that is, we can represent it as sufficient to render illegible letters of a given size at a given distance. It may be that our patient can only read $\frac{6}{18}$ or it may be $\frac{6}{12}$ or $\frac{6}{9}$, when we can say that there is blurring to the extent of $\frac{12}{18}$ or $\frac{6}{12}$ or $\frac{3}{9}$. But practical experience teaches us that the capacity for reading letters of a given size at a given distance is not the same in all cases in which the error of refraction is identical. If we take two of our original patients with perfectly transparent media, both of whom have had their accommodation paralysed completely by atro-

pine and in each case with a + 1 lens each reads $\frac{6}{8}$; we remove the lens in one case, and we find that vision is reduced to $\frac{6}{9}$; we remove it in the other and vision is reduced to $\frac{6}{24}$. Why this difference? Why cannot we formulate a scale, founded on experience, which would tell us that a hypermetrope with paralysed accommodation who can read $\frac{6}{12}$ or $\frac{6}{18}$ has x D. or y D. of hypermetropia? It would appear that there is some other factor besides that which we call accommodation to be reckoned with, a factor which makes the human instrument more complex and less reliable than the mechanical one. At the same time it must not be lost sight of that our standard of $\frac{6}{8}$ is a purely arbitrary and average one, for normal vision is perhaps as often $\frac{6}{5}$, or at least some letters of $\frac{6}{5}$, and occasionally it is $\frac{6}{4}$. There is, too, the possibility that atropine may not act alike with all people, and that in some cases it causes a more complete paralysis of accommodation than in others. Certainly with some patients a greater dilatation occurs. Dr. St. John Roosa¹ observed that scopolamine blurred the image more than atropine, and accounts for it by stating that the former dilates the pupils to a greater extent than the latter. A greater dilatation might naturally be supposed to cause greater indistinctness of vision by admitting peripheral rays and so producing blurring, and in actual practice such is found to be the case, although not to any great extent. To test this point I examined the vision in hypermetropia with paralysed accommodation and dilated pupil, first without, and secondly with an interposed diaphragm having a central perforation of 4 mm. diameter. With an artificial pupil thus formed I found that usually vision was improved up to some letters in the next line smaller than that which could be read without it. For instance, he

¹ *Internat. Clinics*, 4th series, vol. iv., 1895, p. 298.

who could read $\frac{6}{18}$ without, could generally read some letters of $\frac{6}{12}$ with the artificial pupil, and he who could read $\frac{6}{12}$ without, could read $\frac{6}{9}$ partly with. It is usually supposed that myopes "screw up" their lids when they want to see clearly in order to diminish the diffusion circles. But may not the screwing up of the lids cause a compression of the polar diameter of the eye rendering it less myopic? Some myopes can see better by screwing up the lids than they can by looking through a diaphragm with a perforation or horizontal slit. In 48 cases of myopia vision was improved in 18 by screwing, in 6 by a perforated diaphragm, whilst in 24 there was no alteration. There can, I think, be little doubt that alterations of the shape of the eye occur from several causes, and that these alterations are accompanied by a change in the refraction of the eye. Lid pressure, which, according to Bull,¹ is sufficient to exercise a very considerable effect on the cornea, is probably not without its influence. The myope who presses his eye in a backward direction, by means of his finger or the handle of a key for instance, through the upper lid, can usually improve his vision. This I have verified in many cases; and also I find by making myself artificially myopic, by placing a + 2 spherical lens in front of one of my eyes, I can read $\frac{6}{36}$, but by pressing backwards through the upper lid I can read more distinctly. The converse, too, is still more marked, that is by making myself hypermetropic by means of a - 2 D. spherical lens, the very least backward pressure makes the letters considerably less distinct. (In making these experiments the relative distance of the spherical lens from the cornea should be maintained when pressure is made.)

The supposition that the external ocular muscles

¹ *Trans. Eighth Internat. Ophthalm. Congress*, p. 107.

may have some action auxillary to that of the ciliary muscle does not seem an impossible one, for the contractions of the recti and obliqui must naturally exert a certain amount of pressure on the globe. According to Hansell and Reber,¹ the muscles of the eye are always in a state of partial tonic contraction during the period of full consciousness, and under certain circumstances the contraction of all of them produces a slight enophthalmos. In accounting for a case of temporary myopia following a blow on the eye, Mr. Laws² suggests "that the lowered tension of the globe allowed of its being compressed by the tension of the sheath of muscles enclosing it; such pressure would without doubt tend to lengthen the vitreous chamber in the direction of its antero-posterior axis, causing a pushing forward of the lens and relaxation of its suspensory ligament (whose tension must be ultimately dependent on that of the sclerotic) and a pushing backward of the posterior pole, where it is uncovered by muscles." Mr. Priestley Smith reports³ a case of rheumatic paralysis of the internal and external recti of the right eye causing loss of movement inwards and outwards. There was present a myopic astigmatism requiring a —1 D. cy., with the axis horizontal, to correct it. When the paralysis passed off the astigmatism also disappeared. In commenting on this case Mr. Priestley Smith says: "There can be little doubt that the astigmatism in this case was due to a temporary distortion of the cornea produced by the paralysis of the muscles corresponding with the horizontal meridian of the globe. We know that an eye-ball softened by disease may be greatly changed in form by the action of the external muscles, and it is not unreason-

¹ A Practical Handbook of the Muscular Anomalies of the eye, 1899, p. 21.

² OPHTHALMIC REVIEW, xvi., p. 206.

³ OPHTHALMIC REVIEW, iv., p. 354.

able to suppose that a globe of normal tension may be affected in the same way. Loss of tonicity in the muscles of the horizontal plane would permit the muscles of the vertical plane to compress the globe slightly in its vertical diameter and to extend it in its horizontal diameter. This would produce a slight flattening of the cornea in its horizontal meridian, supplemented by a slight increase of curvature in its vertical meridian, a change corresponding exactly with the condition observed." May not this case throw some light on the reason why myopic astigmatism is so frequently associated with a horizontal, whereas hypermetropic astigmatism is associated with a vertical meridian? It is interesting to note that paralysis of the internal and external recti produced a myopic astigmatism with the axes of greatest and least curvature "according to the rule." Moreover, would not an opposite effect to that of paralysis be produced by excess of innervation, for instance, to the interni?

That an alteration in the shape of the globe may affect the refraction is shown by cases of retrobulbar tumours, which by pressing on the posterior pole push forward the macular region and so produce axial hypermetropia.¹ The same effect too may be produced by partial detachment of the retina; and it is moreover known by many astigmatics that vision is improved by pressing on the globe with the point of the finger.

No doubt eyes vary in their power of distinguishing and interpreting the details of small retinal images, still the variation in intelligent persons can hardly be so marked as that which is expressed by the difference between the extremes of $\frac{6}{9}$ and $\frac{6}{24}$. Moreover, if the capacity to recognise small retinal images was con-

¹ "The Refraction and Accommodation of the Eye." E. Landolt, 1886, p. 411.

siderably greater in one person than in another, the visual angle however being the same, we should expect that the more acute would not require his full correction before he could decipher $\frac{6}{8}$. In other words, the hypermetrope of 1 dioptré would be able to read $\frac{6}{8}$ with say 0.50 D., because the slight blurring caused by an absence of 0.50 D. would be compensated for by his extra intelligence. Landolt is of opinion that there is no difference in the visual acuity of typical emmetropic eyes nor in ametropic eyes where the ametropia is of the same kind and degree.¹

The action of the extrinsic muscles probably elongates the visual axis of the eye even in emmetropia and produces a temporary ectasis, and this same action may very well produce curvature hypermetropia. Landolt quotes a case of Mauthner's² in which there was glaucomatous tension from the swelling of a traumatic cataract and the radius of curvature of the cornea was 8.5 millimetres. The lens was extracted, the tension thus lowered, the globe assumed a less globular shape and the corneal radius was reduced to 7.73 mm. Curvature hypermetropia, too, may be produced by central ulcers of the cornea. It will be readily conceded that anything which alters the shape of the globe, whether it be increase or decrease of the tension, ulcer of the cornea, or tumour pressing from behind, may affect the refraction of the eye, and it seems only rational to suppose that muscular action, and it may be lid pressure, are not wholly inoperative in maintaining the form of the eyeball. That the refraction is not affected in cases of ophthalmoplegia externa may be explained by supposing that the action of the muscles as far as accommodation is concerned is an adjuvant of no great importance, and given

¹ *Op. cit.*, p. 230.

² *Op. cit.* p. 413.

paralysis of the ocular muscles, an equivalent would readily be supplied by a very slightly increased action of the ciliary muscle.

Dr. Fukala¹ believes that the meridional portion of the ciliary muscle prevents the excessive dilatation of the eyeball which might be brought about by the external muscles, such an elongation changing emmetropia into myopia or increasing an already existing myopia, the radial (Müller's muscle) and meridional (Brücke's muscle) portions of the ciliary muscle varying according to the refraction. "In emmetropia," he says, "both layers are equally well developed, for the emmetropic eye has a good power of accommodation and resists the action of the external muscles. In hypermetropia the radial layer is the stronger of the two, the meridional one being degenerated, for the hypermetropic eye requires to exercise its power of accommodation, and there is no necessity for opposing elongation of the axis. In myopia there is atrophy of the radial part and hypertrophy of the meridional part, for accommodation is in this case less required, but it now becomes important to prevent elongation of the axis of the eye." Von Arlt's and Fuchs's investigations of the cause of malignant myopia show² that the external rectus and inferior oblique press on the venæ vorticosæ during the effort of convergence. The external rectus, Landolt³ says, "is in contact with a greater extent of the sclerotic in proportion as the convergence is stronger, or as the globe is more voluminous. The eye, clasped between the contracted internal rectus and the stretched external rectus, and compressed, too, by the oblique muscles and the superior and inferior recti, must have a ten-

¹ *Lancet*, 1898, i., p. 826.

² *Archiv. f. Ophth.*, vol. xxx., 4, 1884.

³ *Landolt, Op. cit.*, p. 438.

dency to become elongated antero-posteriorly. When one examines the horizontal section of a myopic eye, one cannot help feeling that this muscular pressure must have contributed largely to give it its elongated shape and the prominent curvature at the outer side of the papilla." Doubtless the globe is in some measure protected from excessive pressure of the recti by the restricting action of the intracapsular ligaments, but the compression of the globe by the obliques, which lack these ligaments, is consequently less controlled.¹

It is a curious fact that we can only very approximately foretell in operations for high myopia by removing the lens what the eventual condition of the refraction will be in any given case. After an operation for senile cataract in an emmetrope, the probability is that a $+ 10$ D. lens or thereabouts, with perhaps a cylinder to correct some astigmatism produced by the wound, will be required, but in young myopes we are unable to make so accurate an estimate. Lawford² says that the alteration in refraction in these cases, as a result of operation, is usually from 13 to 16 D., whilst in a case of Schweigger's, which he quotes, there was 33 D. of myopia before operation and 13 afterwards, that is, removal of the lens had diminished the refraction to the extent of 20 D. In accounting for the improvement of vision Lawford quotes Eperon in favour of an actual shortening of the globe taking place after removal of the lens. He suggests that the improvement of vision in these aphakic eyes is due to the facts: first that the retinal images are very much larger; second, that the central part of the retina is better illuminated; and third, that there is less dispersion of rays after they enter the eye. But though these

¹ A. S. Percival on the "Diagnosis of Ocular Paralysis." *Trans. Northumberland and Durham Med. Soc.*, 1897.

² *Brit. Med. Jour.*, ii., 96, p. 632.

reasons may be the explanation of the improved vision, they do not explain the alteration of the refraction. Percival,¹ Adams Frost² and others, quoting from older authorities, have pointed out that the variations in different degrees of myopia are due to a well-recognised law in physiological optics with regard to the relative distances of the first principal focus in front of the cornea, and the second principal focus behind it, due allowance being made for the distance between the eye and the correcting lens, the effect being greater in the higher degrees of axial myopia, because in order to correct the myopia the focus of the lens must coincide with the far point of the eye. The more, therefore, the correcting lens approximates the far point the greater must be its strength. Mr. Frost gives a useful table for the correction of vision in aphakia, produced by operation for high myopia, which will be found approximately correct (due allowance being made for any cicatricially produced astigmatism) ; but, as was perhaps to be expected, it is not absolutely reliable, and considerable variations will be found between the theoretical and the practical correction, and it is to be remembered that in many of the cases the myopia is not solely axial. For instance, in one case of my own, in which the correcting lens before operation was $+14$ sp. $\ominus +6$ cy., after several needle operations, a $+1$ sp. $\ominus +2$ cy. was required ; whereas another case, in which there was 18 D. of myopia before operation, required a $+1$ D., sp. $+1$ D. cy. after. In a myope requiring -20 D. before, no lens was required after ; but in another patient also with 20 D. of myopia a $+1$ $\ominus +6$ cy. was necessary after treatment. It should, however, be noted that in this latter case a linear extraction was resorted to. Such cases could

¹ *Archives of Ophthalmology*, 1897, p. 1.

² *Edin. Med. Journal*, 1898, p. 326.

be multiplied, showing that within a few D. it is impossible to prognosticate the eventual refraction. It would seem probable that in these cases there is some return of the globe to a more normal shape. On the other hand, in senile cataract in emmetropes there is no pathological change in the shape of the globe, and hence the difference in refraction is a regular one of about 10 D. In myopia, Landolt¹ tells us, the muscles lack strength and "grip," as if "by an excess of tension they had lost their elasticity and contractile power," and he points out that in convergence there is no doubt about the muscular pressure thereby produced. In evidence of this he reminds us that in a state of absolute rest, under the influence of an anæsthetic, of syncope, or after death, the eyes diverge.

In conclusion, there would seem to be no doubt that the visual acuity of emmetropes, with an equal amount of error and with paralysed accommodation, varies very considerably, but it would seem to be uncertain (1) whether this variation in the acuity is due to a difference in the amount of cycloplegia, produced by atropine in different persons, or (2) whether it is due, as I suggest, to differences of tonicity in the external ocular muscles of different individuals, or (3) whether it is due to any other cause.

¹ *Op. cit.*, pp. 425 and 449.

REVIEWS.

SIEGRIST (Basel). Contribution to the Knowledge of the Anatomical Basis of Alcohol Amblyopia. *Archiv für Augenheilkunde*, March, 1900.

The existence of a form of partial atrophy of the optic nerve in which the affection is confined to the "papillo-macular bundle" is now well known, and, according to de Schweinitz,¹ has been proved by more than twenty records of microscopical examination. According to the same authority, however, in none of these cases, with one possible exception, was there any proof that the disease which gave rise to the condition was a pure toxic amblyopia.² Siegrist's paper forms no exception to this rule. It furnishes an additional example of well-marked degeneration of the papillo-macular bundle, symmetrical in the two eyes, and demonstrates the varying shape and position of the bundle in different parts of the nerve, exactly confirming in these respects the work of previous investigators. On the other hand, the information, only obtained subsequently to the *post-mortem* examination, that the subject had been a heavy drinker during life, is hardly sufficient evidence on which to base a diagnosis of the cause of this condition.

The existence of these cases being undoubted, while their cause is yet obscure, the first question to decide is the exact nature of the atrophy to which the papillo-macular bundle is subject. There are two views as to this. One is that the atrophy results from an interstitial inflammation of the connective tissue forming the trabeculæ, and that the proliferation and contraction of the latter destroy the nervous tissue proper. The other is that the atrophy is simple, being consecutive to disease in the ganglion cells in the macular region of the retina, and that the increase of connective tissue is only secondary. The latter view was put forward by Nuel in 1896;³ the former

¹ Norris and Oliver, iv., 811.

² *Ibid.* iv. 809.

³ Review in OPHTHALMIC REVIEW for 1896, p. 272.

is the view of most of those who have studied the condition, such as Samelsohn, Uhthoff and Nettleship, and the present case lends decided support to the view of the majority. In the two nerves which he examined, Siegrist pronounces the inflammation to have been interstitial and not consecutive to macular disease on these grounds: (1) In transverse section the number of nuclei in the diseased track was increased. (2) A total absence of lacunæ such as are left after simple atrophy of the nerve fibres, for example, in cases of tabes. (3) Although sections of the retina showed considerable atrophy of the ganglion cell layer between disc and macula, this atrophy was not symmetrical round the macula, such as one would expect to follow disease commencing in that region, but on the temporal side of the macula very soon ceased, while on its nasal side it extended to the disc.

The evidence seems to point to an interstitial inflammation as being the most usual variety of disease in this situation, although Siegrist himself finds it difficult to accept this view in an unqualified way, on the assumption that alcohol is the cause of the disease, on account of recent views as to the action of alcohol. In multiple neuritis it is the nerve-fibres themselves that are primarily attacked, and even cirrhotic liver and contracted kidney, according to Weigert and Roux, are primarily affections of the epithelium and only secondarily of the connective tissue. Is it, then, likely that, in the case of the optic nerve, the action of the poison should be of an altogether different nature?

To the reviewer, it seems most probable that both conditions — interstitial inflammation and consecutive atrophy—occur. It has been proved experimentally that in the monkey a lesion between the disc and the macula is followed by a consecutive atrophy of the bundle in question.¹

Presumably, then, any disease which picked out for

¹ Dean and Usher, *Trans. Ophthal. Soc.*, 1896, p. 272.

destruction the ganglion cells of the macular region would have a similar effect. Nuel's case may have been one in point, although in the total absence of clinical history the assumption on his part that the cause was toxic was certainly unjustifiable. Indeed, as to what the exact relation of alcohol, tobacco, or any other poison, to either of these conditions may be, we have at present very little evidence to show. The fact that in ordinary cases of toxic amblyopia complete recovery is the rule, seems to show that in its early stage the disease can have no gross anatomical basis at all, but is either of a vascular nature or is an affection of the nervous tissue which is merely functional.

A. HUGH THOMPSON.

DE LAPERSONNE (Lille). Evisceration by the Cautery. *Archives d'Ophthalmologie*, June, 1900.

Among other subjects put down for discussion at the approaching Congress of Medicine in France is the question which is always with us, and is likely to be always with us—What are we to do in cases of panophthalmitis? With the object of placing additional facts before the attention of those likely to be interested in the matter, de Lapersonne describes the methods which he employs and some details of various patients on whom his operation has been performed. At the outset it may be briefly stated that there are three steps which may be taken besides the simple application of moist warmth to the inflamed eye. These are: Laying open the abscess in the globe as one would open any other abscess; Evisceration; and Enucleation. De Lapersonne begins by frankly avowing that at one time he was an ardent advocate of enucleation, believing that in this way, without any serious risk, he was able to get quit of the whole focus of disease, and that consequently, since healthy tissue alone was cut into, there was no fear of any evil happening. But like many others who have held that opinion (though not all), he had by-and-by an unfortunate result in the person of

a child who died of meningitis following enucleation. It is not by any means clear from the brief notes which he gives of the case either that enucleation was itself the cause of the infection of the meninges, or that *earlier* enucleation would not have totally prevented the untoward result, but at all events his ardour as an advocate of enucleation has waxed entirely cold, and he is now in favour of evisceration by means of the cautery.

There are differences in the methods of performing the operation of evisceration, some using a sharp spoon with which to clear out the contents of the globe, others holding that a blunt instrument offers less risk of opening up the lymph channels unnecessarily, and others again using only water pressure or small sponges. The method which comes nearest to the author's is that of Guaita. He arrests hæmorrhage by irrigation with cold corrosive sublimate solution after wiping the uveal coat from the sclerotic by means of small sponges, and then with the cautery at a dull red heat, touches the inner surface of the sclera, especially about the region of the disc. By this gentle means of removing the vascular tissue—quite satisfactory unless the choroid is pathologically adherent to the sclerotic—and by not suturing at all, but only introducing a strip of sublimate gauze into the empty globe, Guaita succeeds in doing away with the severe reaction apt to follow on evisceration almost completely. Fage also has recommended the use of the cautery.

De Lapersonne considers, however, that this method of removal of uveal tissues by sponges and the comparatively mild use of the cautery are a mistake; for the large vessels, and the lymphatic trunks as well, are but imperfectly closed, besides which the *débris* of the choroid, being only partially destroyed, may remain behind. The cautery should be applied more vigorously. Accordingly he proceeds as follows: With a bistouri, or Graefe knife, he makes a transverse incision of the cornea, which is then converted into a crucial incision by two snips with the scissors. He does not see that there is any particular advantage gained by the actual removal of the cornea, while its division thus by

four incisions carried beyond its margin allows very free entrance to the deeper parts. When any pus which may be present has escaped, and when he has turned out the lens, and without trying to remove the membranes, he introduces a large thermo-cautery, shaped like a knife, and larger than any which is ever used for ophthalmological work as a general rule. This at white heat is, by a slight turn, applied to the whole interior of the sclerotic. In order to accomplish this thoroughly it may have to be removed, cleared of charred fragments of choroid, pus, or vitreous, heated again, and re-introduced; especially must the papillary region be completely seared, no part of it must be permitted to escape the direct action of strong heat. The empty globe is thoroughly doused out with an antiseptic lotion, and well dusted over with iodoform; no stitches are inserted.

Immediately after the operation pain completely ceases; for two or three days the secretion is fairly abundant as the burnt tissue is thrown off, but the author now finds that the intraocular injections which he formerly employed are quite unnecessary. The final result is the existence of a small firm mass, retaining the shape of the globe, with the opaque cornea in front, quite free from pain, and tolerating well the carrying of an artificial eye, while of course movements are free.

As regards the indications for the operation, it may be considered as the best procedure in panophthalmitis, and the worse the case the better does the procedure show itself to be. The antiseptic action of the heat is not confined, says de Lapersonne, merely to the parts actually impinged upon the cautery, but the heat radiated from it destroys foci of inflammation in the tissues beyond the actual touch of the iron. Thus, where there is a phlegmonous condition of the orbital tissues, this is rapidly reduced by the cauterisation; "it sterilises, so to speak, the tissues of the orbit."

To the reviewer it seems that it can only sterilise where the tissue is actually destroyed as tissue, when it must be replaced by lifeless fibrous substance, and he therefore

doubts how far it can be expected that a really mobile stump can be long retained. He is accustomed to consider evisceration by means of the half-blunt eviscerator and the syringe the best of all treatment for panophthalmitis, and he does not feel that this more brutal method of operating is at all an improvement, or in any way to be desired or recommended.

W. G. S.

TRANTAS (Constantinople). Ophthalmoscopic Examination of the Anterior Parts of the Fundus. *Archives d'Ophthalmologie*, June, 1900.

It has always been a matter of regret that the area of fundus visible to us by ophthalmoscopy is so limited; the whole ciliary region and even the more anterior parts of the choroid are beyond reach, since on an average no spot anterior to a line drawn at 8 mm. from the corneosclerotic margin is capable of being rendered visible with the ophthalmoscope, though this limit varies a little with the refraction of the eyes. Thus de Wecker has shown that when scleral puncture has been performed, the scar is quite out of ophthalmoscopic range unless it be further from the corneal margin than 8 mm.; other observers have fixed a limit which differs but slightly from this. Dimmer has proved that the area visible by the direct method is somewhat larger than that for the indirect. Various methods have been devised and instruments invented with the purpose of extending anteriorly the region under our observation, but Trantas states that he is able to bring into view a considerably greater area by the very simple process of slight pressure on the globe in the ciliary region. If one, he says, when examining with the ophthalmoscope by the direct method, presses gently either directly or through the lid upon the exact part of the ciliary portion which he desires at the moment to see, that part is dimpled inwards and becomes visible; the crests of the ciliary processes are thus pressed into the path of the light rays and catch the illumination, appearing then like a row of dark teeth arranged in the

form of a crown immediately behind the circle of the iris. The best sort of case in which to see this appearance is that of a hypermetrope not too dark in complexion, whose pupil has been fully dilated, and whose sclerotic, it is needless to say, is not too rigid; but Trantas asserts his ability to bring the ciliary processes into view in practically all normal eyes. The procedure does not seem to be very agreeable to the patient, for all that he can say is that it is endurable (*assez supportable*) after cocain has been instilled. It is even possible to see the ciliary processes by focal illumination by means of pressure, if one places his head so as to look almost along the line of the illuminating rays; they then appear as alternate black and grey lines.

In order to make quite certain that he was actually able to see what was otherwise invisible, he passed a needle through the anterior part of a recently enucleated eye, whose media were quite transparent, then examined with the ophthalmoscope in the ordinary manner and failed to see the needle at all, but on applying compression externally, he was able to bring into view a considerable portion of the needle; similarly, by means of a sharp point he scraped a little pigment off the anterior part of the choroid in a region so far forward that, with the ophthalmoscope used in the ordinary manner, the barren patch was not to be seen, while by his little manœuvre it came clearly into view.

Everyone knows that when fairly strong light is allowed to fall upon the outer portion of the sclerotic it can be seen to light up the opposite portion after passing through the media. Druault showed that in this manner a portion about 6.6 mm. behind the limbus in the average eye was visible when a very powerful light and a high lens were employed, but by applying to the inner part of the sclerotic a lachrymal probe and exerting with it a little pressure, Trantas finds that he gains from 2 to 3 mm. more, which brings into the line of sight a considerable part of the ciliary body.

In the case of a patient of his own, a girl of 16, whose eyes, from their prominence, elasticity, and poverty of

pigment were particularly suitable for his method of examination, Trantas was able to diagnose and carefully observe a patch of atrophy of pigment in the ciliary region which he could not make out by the ordinary method *even when he knew*, from having previously used pressure, *that it was there*. He suggests that this may help to point out the wisest line of treatment in certain cases of sarcoma in the iris itself or in the angle of the iris, for if the surgeon can satisfy himself that the ciliary processes are not involved, he may be able to remove the growth completely by means of a large iridectomy and so preserve the eye, while if the processes can be seen to be already attacked, enucleation is the only permissible course to pursue. For diagnostic purposes he has also found his method valuable in certain cases of congenital irideremia and traumatic irido-dialysis, informing him as it did of the condition of the ciliary processes; and in other circumstances besides.

W. G. S.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

FRIDAY, JULY 6, 1900.

G. ANDERSON CRICHT, M.A., F.R.C.S. Edin.,
President, in the Chair.

CARD SPECIMENS AND CASES.

Case of (?) Pseudo-glioma, with microscopical section—Mr. E. W. Brewerton.—The tension in this case was minus, the lens clear and the iris bound down to the anterior capsule. Microscopically the ciliary processes were seen to be dragged inwards by the growth. The retina was completely detached and separated from the choroid by a semi-solid exudation; below there was a blood effusion. The anterior part of the growth in contact with the lens consisted of cicatricial tissue; directly behind this, a layer of loose alveolar tissue (probably the remains of the vitreous) with folds of the detached retina extending into it, these folds in places being dilated into large cystic cavities. The ciliary processes, besides being dragged inwards by the growth, show large round-celled infiltration and extravasations of blood, and multiplication of pigment cells with much derangement of pigment also present.

In sections of optic nerve the lumen of the arteria centralis was seen to be much encroached upon by inflammatory thickening of the sub-endothelial tissue.

In the discussion which followed, Mr. C. D. Marshall asked if there was a history of fits in this case, as he had found in many cases of pseudo-glioma associated with basal meningitis; the inflammation probably travelling forwards and giving rise to the pathological condition in the eyeball.

Mr. Jessop confirmed the presence of endarteritis in the central artery in the nerve section, and enquired how soon there could be cystoid degeneration of the retina? how soon the retina would be thrown into folds? and whether in this case they were dealing with a foetal condition or with an inflammatory condition of two or three months standing?

In reply Mr. Brewerton stated there was a history of fits a month previous to the onset of the disease.

Case with Congenital Notch in each Lower Lid—Mr. T. Collins.—The interest of this case is greatly enhanced, not only by its extreme rarity—only two other cases reported, one by Mr. Berry in the *R. L. O. H. Reports*, vol. xii., and one shown by Mr. Collins, at the June meeting of the Society—but also by the accompanying symmetrical flattening of the cheeks, due to absence or want of development of the malar bones. In Mr. Collins' previous case this was also observed, but not in that by Mr. Berry.

The patient was a male. His right lower lid had been injured, and now entropion was present with partial lagophthalmos. The notch in both lower lids was directed downwards and outwards, not median in position, but a few millimetres from the outer canthus.

No abnormality was found in the left eyeball. The absence of the malar prominences giving a remarkable, extremely emaciated, hatchet-like shape to the face.

Sections of Conjunctiva from a Case of Spring Catarrh—Mr. W. T. Holmes Spicer.—The mucous membrane in these sections was crowded with small pedunculated growths having thin stalks; these, where closely pressed and flattened together, look like the pile of plush. They had the usual paving-stone arrangement microscopically. Some of the larger growths in section showed an outer layer of conjunctival epithelium with five rows of cells, the centre of the growth being chiefly composed of fibrous tissue with ingrowths of the epithelium, which latter had in places the appearance of cell nests, their connection with the ingrowing epithelium not being in the section. There were many blood vessels in the centre of the mass. The pedicle structure was very similar, a connective tissue basis with blood vessels covered in by

epithelium. Mr. Spicer considered the growths in the limbus to be of the same structure and nature as those scattered over the conjunctiva elsewhere, and gave as his opinion that they were simply multiple fibromata—a view in which he is supported by certain continental writers (*conf. Archiv f. Augenheilkunde*, vol. xxxv.).

Tubercular Ulceration of the Ocular Conjunctiva with enlargement of the Pre-auricular Gland—Mr. Jessop.—In this patient—a boy—there was no previous tubercular history. After an injury to the globe by a fall, the eye became bloodshot and the pre-auricular gland became swollen and painful, and a small ulcer with hardened edges noticed in the conjunctiva. This was treated as a specific lesion with mercurial wash and internal anti-specific remedies, &c., but with no good result. The ulcer extended from just in front of the accessory lacrimal gland for about 1·5 cms. upwards, reaching to within 1 mm. of the corneal margin. The pre-auricular gland was enlarged, as well as glands in the neck and axilla. Inoculation of a guinea pig from the ulcer had proved fatal from unmistakable tuberculosis. Mr. Jessop considered the galvano-cautery the best treatment.

Mr. Holmes Spicer said he had seen many cases similar to this and of undoubted tubercular origin, in all of which the pre-auricular gland was early affected, and this he stated to be the rule rather than the exception. He strongly advised deep and very thorough scraping together with the use of the galvano-cautery, which he had found most successful.

Dr. Garroway suggested the application of formalin.

The President also recommended the cautery.

Crescentic Non-vascular Opacities of both Cornea in a Young Man—Mr. Frost.—This case presented an appearance as if of greatly exaggerated arcus senilis, much wider above and below than at the sides. In the right eye the upper third of the cornea was occupied by a greyish opacity of crescentic shape corresponding to the part covered by the upper lid. The opacity was densest at the lower part and lay in the substance of the cornea, the surface over it being quite smooth and glistening. There was no evidence of trachoma either past or present, the lids being quite healthy. V. = R. $\frac{6}{6}$; L. $\frac{6}{6}$.

PAPERS.

"Holes" at the Macula: a Result of Injury to the Eye by Concussion.—Mr. F. M. Ogilvie prefaced his paper by remarking that, though concussions of the eyeball may produce any kind of injury to the eye direct or indirect, yet one variety of injury to the retina

by force applied by a blunt instrument, such as a ball (not causing a perforation of the eyeball), had as yet scarcely been dealt with in any collective or categorical manner. The retinal lesion in a typical case is very remarkable, and is in his opinion diagnostic of the kind of injury which produced it. Briefly the characteristics are, that at the macula there is an appearance of a deep punctured hole, generally circular or oval in shape, as if the macula had been trephined out; this corresponds pretty closely to the size of the macula, and usually has a diameter of about $\frac{1}{2}$ or $\frac{1}{3}$ of that of the optic disc. This area is always depressed below the level of the surrounding fundus, bright red in colour, and with clean cut edges; the depth of the "hole" he finds to be on an average 1.5 D., which he accounted for by supposing that the level in this region had sunk to the bottom of the fovea. He reported some fifteen cases and showed an excellent series of lantern slides of each. In every case the eyes injured had previously been healthy, with no evidence of any degenerative change. In only two cases was there any considerable error of refraction, and in no case was there an excessive degree of myopia.

Mr. Ogilvie divided the cases into two classes depending on the position of the surrounding retina: Class A, with no retinal detachment, except at the "hole;" Class B, with, in some cases, extensive general detachment of the retina, in addition to the "hole at the macula." A brief description of one of the cases would apply more or less accurately to the whole group.

H. T., aged 12, schoolboy. *History*: Was struck in the left eye with a stone nine months ago. The lids swelled very much at the time, so that the eye for some days could not be opened. When this could be done the patient noticed that vision was very dim and that everything looked red. This red effect passed away gradually, but the sight remained dim. L. V., fingers at 1.5 metre, J. 20; field of vision full for white, an absolute central scotoma, T.n. R.V. $\frac{5}{6}$.

Left eye, ophthalmoscopically, media clear; O. D. on its temporal side pale, and the margins downwards and inwards are not well defined.

At the macula is a circular area deep red in colour $\frac{1}{2}$ or $\frac{1}{3}$ optic disc diameter in size, the area sharply defined and surrounded by a ring of sodden whitish looking retina, which merges gradually into the surrounding fundus. The appearance was such as would be produced by a trephine hole at the macula, and was rather aptly compared to a hole broken in thin ice. Pleats or ridges extend radially from the edges of the hole over the surrounding retina. The floor was peppered with fine pigment

dots; in one place there was a depression of 1·5 dioptries below the retina. Mr. Ogilvie endeavoured to explain these lesions by an investigation and application of the laws of physics; by the teaching of anatomy with reference to the retina and macular region; and finally by pathology. From the physical point of view the eye is simply an elastic sphere filled with fluid in which waves are developed, all of which, primary as well as secondary, are directed to a spot opposite to that upon which the blow may impinge.

Anatomy shows the retina to be firmly adherent at optic disc and ora serrata, but between these points it can be readily lifted off from the underlying pigment epithelium. The macula lies at the posterior pole of the eyeball, and the fovea is the weakest part of the retina, but the edges of the macula are the thickest part of it (·49 to 0·50 mm.). From this thick edge the retina dips sharply to the fovea centralis, the thinnest part of the whole retina (0·1 mm.). No blood vessels exist there, and the nerve fibres sweeping *round* this region further tend to weaken it, the cup being formed at the expense of the thickness of the retina. Now if a force be applied to the centre of the cornea the greatest transmitted effect is felt at the macula, the weakest spot of all; this force may be supposed to fracture the retina at the weakest spot, causing a many-starred fracture, the radii of which are from the edge of the macula towards the fovea, and also further outwards.

This, of course, is the old theory of *contre coup*, which, though found pathologically incapable of accounting for fracture of the base, is quite applicable in the case of an elastic fluid-containing sphere like the eyeball.

Portions of the fractured inter-macula retina remain as granules in the centre of the hole on the choroid, while the edges and other portions curl up outwards and become hidden behind the edges of the hole. The pleats or folds seen across the retina are probably due to retinal œdema, as they disappear after a time. The vision in most cases is from $\frac{6}{40}$ or $\frac{6}{36}$, and metamorphopsia may be present; an absolute central scotoma is usually to be found.

In Class B, the detachment of the retina differs from the usual, in that the retina remains transparent and the separation shows no tendency to increase, even after many years; it is usually shallow and extends over a large area. In all cases, some vision, however poor, has been retained. The eye, viewed as a whole, is strikingly free from those degenerative changes which are found usually in old and long-standing detachments.

Finally Mr. Ogilvie pointed out that certain definite conclusions are to be drawn from these cases.

(1) The lesion is fairly definite and constant in size, shape, and appearance, and is always in central region.

(2) The appearance is the direct result of the injury.

(3) The appearance remains unaltered for many years, perhaps through life.

(4) The general disturbance of vision is slight.

(5) The appearance is found as the result of concussion injuries to the eye and from no other cause.

Alveolar Carcinoma of Eyelid.—Messrs. Kenneth Scott and John Griffiths described a case of primary carcinoma starting from the Meibomian glands in the eyelid.

Notes on a Case of Optic Nerve Tumour.—Mr. C. D. Marshall read the *post-mortem* report on a case previously described before the Society. This showed primary sarcoma of the ciliary region and carcinoma of the liver.

Three Cases of Ophthalmitis (Pseudo-glioma) in Children; one recovery, two fatal from Meningitis.—Mr. P. Flemming.—In all there were general symptoms of head retraction, vomiting, drowsiness and irritability, with irregular pyrexia. *Post-mortem*, the cases showed typical basal meningitis and generally pus in middle ear.

He considered the mortality to be not great, as out of forty-two cases only six deaths from meningitis had occurred, four of these having had pus in the middle ear. His opinion was that it was caused by a variety of pyæmia very similar to the condition of pseudo-glioma found in some cases after puerperal pyæmia.

COLLEGE OF PHYSICIANS OF PHILADELPHIA, SECTION ON OPHTHALMOLOGY.

Dr. GEORGE C. HARLAN, Chairman.

February 20, 1900.

Mental Disturbances after Operations upon the Eye.—Dr. W. C. Posey reported 24 cases of delirium, in 19 of which the mental symptoms developed after the removal of cataract, in 3 after iridectomy for glaucoma, and in the remaining 2 after extensive wounds of the eye. Three of these cases were in subjects over 80 years of age; 6 over 70 years; 9 over 60 years, and 2 during the 6th decade. The traumatic subjects were much younger.

The delirium appeared during the first twenty-four hours after

the operation in 2, on the second day in 8, on the third day in 6 and the fourth day in 2. No atropin was used in 6 instances; in 4 others it was not employed until the delirium had manifested itself, and in the others it was instilled at the time of the operation. Its employment did not seem to have any influence whatsoever upon the mental condition. Both eyes were bandaged after the operation in every instance, but the dressing was removed from the unoperated eye in 9 cases as soon as the delirium manifested itself, without giving any appreciable relief to the mental condition.

It was specifically noted in 9 cases that there was absolutely no tendency toward mental derangement. Evidence of previous tendency was present in only 2 senile and in the traumatic cases. All of the eyes made a good recovery except in two instances—one of panophthalmitis and one of traumatic irido-cyclitis. The delirium was of the same character in all, beginning with a mild restlessness which rapidly developed into an active delirium with hallucinations and ideas of persecution, but passing rapidly under control by the proper administration of narcotics; permanent affection of the brain being remarked in not a single instance.

The writer believes that the cause of the delirium is largely psychical, and he agrees with Parinaud that it is due to the preoccupation upon the part of the patients prior to and after the operation. What the other factors are, which in addition to the preoccupation determine the delirium, are as yet unknown. The frequency with which the delirium is encountered should however, be recognised, and proper treatment, namely, chloral and bromides, be administered at the first indication of its appearance. Removal of the bandage from the unoperated eye and discontinuance of the use of atropin are not advised. Constant oversight and judicious and tactful nursing are most essential, and rapid amelioration in the mental condition frequently follows the installation of a proper person by the bedside.

Discussion.—Dr. de Schweinitz said that the most pronounced case he had ever seen occurred in a man aged 59, upon whom he had performed Förster's operation for the artificial ripening of the lens of one eye, and one month later extracted the opaque lens. The man had nuclear cataracts, and vision, except in the central portion of the field, was good. He had organic heart disease, and for several years before the operation had considerable family trouble. Both eyes were bandaged after operation. On the second day maniacal delirium developed, followed by dementia, lasting for two months. Under large doses of nitroglycerin the mental symptoms disappeared and he eventually secured vision of $\frac{3}{4}$. Two years later the man returned to have the naturally ripened cataract upon the other eye removed, and begged that he might be allowed to have the good eye unbandaged after operation. This was done, and he made a rapid recovery without mental disturbance. Dr. Zimmerman stated that while resident at Wills Hospital he had seen numerous cases. The custom at that time was to unbandage the sound eye and get the patient out of bed

at the earliest possible moment after the onset of mental aberration. Dr. Veasey also reported mental symptoms after two cases of operation—one a patient upon whom the rolling operation was performed for granulated lids, and the other a case of senile cataract. In both instances the delirium subsided upon the removal of the bandage from the unoperated eye. On the other hand, Dr. Randall had removed the bandage in order to check delirium in a cataract patient with absolutely no result, the delirium continuing uninterruptedly for four or five days. Dr. Harlan stated that the delirium had many types and causes, and that no one explanation would be satisfactory for all cases; therefore the treatment must be diversified to meet individual requirements. Dr. Posey referred to a recent article by Dukes, to the effect that the restlessness of old people is due to the gradual age-failing of the scavenger organs, and that it is owing to the incompetence of these that the blood is not sufficiently depurated, and that arterial tension is increased. This author believes that the remedies best adapted to calm these individuals are those which relieve the arterial tension, such as nitroglycerin, though he adds that he found erythrol tetranitrate, gr. $\frac{1}{2}$ or 1, to be even more valuable.

Concerning the Preparation of the Stump after Complete Enucleation of the Eyeball.—Dr. de Schweinitz first reviewed some of the substitutes which have been advocated for enucleation, viz.: optico-ciliary neurectomy; sclero-optic neurectomy (Ernest Hall); eviscero-neurectomy (Huizinga); simple evisceration (Noyes, Graefe); evisceration with the insertion of an artificial vitreous (Mules); implantation of a glass or metal globe in Tenon's capsule (Frost, Lang); abscission (Critchett, Knapp, de Wecker); and complete keratectomy (Panas). Of these various procedures in suitable cases he preferred Mules's operation: but believed that in a certain number of instances complete enucleation would always be required, and that therefore all attention should be paid to improvement in the technique of the operation and the manufacture of artificial eyes.

After describing Meyer's and de Wecker's method of performing enucleation and condemning Czernak's dictum that sutures should be discarded, Dr. de Schweinitz described the methods of suturing the tendons with the conjunctiva after enucleation which have been advocated and practised by Würdemann (1893), Suker (1895), H. Schmidt (1897), Priestley Smith (1899), and himself. His own method of preparing the stump after enucleation he described as follows:—

After insertion of a speculum which widely separates the lids, the conjunctiva is divided as close as possible to the corneal margin; each rectus tendon is next exposed and caught upon a hook, as in the operation for strabismus, and is secured with a double-armed black silk suture, which is knotted upon it. The eyeball is now enucleated with the least possible disturbance of the relations between the conjunctiva and the underlying structures, and a small ball of sterilised gauze is inserted into the capsule of

Tenon, in the manner in which a Mules's sphere would be placed in the operation of implantation. Each rectus tendon is now drawn forward to the edge of the cut conjunctiva and securely fastened with the ends of the same suture which had originally secured the tendon and which have been left long. That is to say, the tendon is brought forward precisely as it would be in the operation of advancement. The wad of sterilised gauze, which has served its purpose of checking entirely the hæmorrhage and keeping for the time being the cavity bulged out as it was when occupied by the globe, and therefore has facilitated the advancement of the tendons, is now removed, and the edges of the conjunctiva and capsule of Tenon are united with interrupted sutures.

Primarily the movement of the conjunctival bed is certainly better after this and the other operations, which in one way or another prevent retraction of the tendons of the ocular muscles, than after ordinary enucleation, and it seemed also that the prothesis is more prominent and natural and that unhealthy conjunctival secretion is lessened. Charts illustrating the rotations of the artificial eye resting upon stumps prepared in various ways were exhibited.

Discussion.—Dr. Harlan stated that in his early experience at Wills Hospital it was the custom to bring the edges of the conjunctiva together with sutures after cases of enucleation. Dr. Hansell believed that operators uniformly endeavour to secure a stump upon which the prothesis would rest, and by which it could be moved; but after a well-performed enucleation there is no stump; that the movement and setting of the eye will depend solely upon the mobility of the conjunctival membrane upon which the eye rests, the mobility depending upon the attachment at its centre posteriorly of the four recti muscles. He has secured fair cosmetic result and good rotation of the eye and a clean, non-discharging conjunctival surface by suturing each straight muscle to the conjunctiva and capsule as the first step of the operation.

Foreign Body in the Eyeball.—Dr. Charles Lukens reported a study of 18 cases, in 16 of which an attempt to remove the metal was made. In 2 cases the metal was in the anterior chamber, in 3 in the iris, in 5 in the crystalline lens, and in 8 in the vitreous chamber. Good vision followed the removal of the metal in 9 of the 10 cases in the anterior segment of the globe, while of the vitreous cases attempts to remove the metal were made in 6, with success in 4 instances, vision equalling $\frac{6}{6}$, $\frac{5}{8}$, $\frac{1}{10}$, and light perception. In one case a piece of steel had remained quiescent in the vitreous chamber for twenty-six years, irido-cyclitis following a recent traumatism.

A Foreign Body setting up Irido-Cyclitis after Quiescence for Eighteen Years.—Dr. de Schweinitz described a case in which a foreign body (metal), which had remained quiescent in the choroid of a practically blind eye for eighteen years, suddenly and without apparent cause, set up irido-cyclitis which threatened the other eye. The body was accurately localised by means of

the Roentgen rays according to Sweet's method. The magnet momentarily brought the body to the lips of the incision, but could not dislodge it from the tissue in which it was encased, either then or after the enucleated eye had been opened by a meridional section. The piece of metal was 1.5 mm. long and 1 mm. in thickness.

Discussion.—Dr. Oliver described in greater detail case No. 11 in Dr. Lukens's paper, in which the diagnosis of the location of the foreign body had been made by the direction of the scleral cut and the relative positions of the lips of the wound, in association with the assertions of the patient as to the angle of the receipt of the blow, and the diminution of the visual field to the nasal side, thereby confirming by this method the accuracy of Dr. Sweet's diagnosis by X-rays. Dr. Sweet believed that when the metal entered the vitreous chamber without sufficient impetus to imbed itself in the retina or choroid, its successful removal by the Hirschberg magnet may be expected even after a considerable time. He instanced three cases of this character, in one of which the body had been removed with good vision seven months after the accident. When, however, the metal is imbedded in the retina or uveal tract, a firm exudate may form in a short time. In one case a piece of steel 8 mm. long by 2 mm. broad, imbedded in the choroid for five weeks, could not be secured by the magnet, and even after enucleation the metal was only faintly attracted by the magnet point, and could not be dislodged from the exudate surrounding it.

Dr. Sweet exhibited a number of photographs which he had received from Dr. J. Mackenzie Davidson, of London, illustrating the apparatus and method so successfully employed by the latter in the localisation of foreign bodies in the eyeball and surrounding structures.

Dr. Zimmerman referred to a case in which a piece of copper had remained in the anterior portion of the vitreous for many years without causing inflammatory symptoms. Dr. Harlan had also seen a piece of copper cap remain quiescent in the eye for years. Dr. Hansell referred to a boy who was struck in both eyes by powder grains and sand. The blow was so violent that the capsules of the lenses were ruptured and probably some of the foreign material had entered the anterior chamber. When seen in consultation, some weeks after the accident, the external wounds had healed, the anterior chambers were partly filled with swollen lens substance, the pupils were dilated and the irides immovable, T. + 2 and sight reduced to perception of light. The broken lenses were forced out through corneal incisions, eserine instilled, the eyes bandaged, and the patient put to bed. Some months later with cataract glasses his vision was normal.

A Study of the Changes in Refraction in Four Hundred Eyes during Seven Years.—Dr. Howard F. Hansell tabulated 200 consecutive cases of refraction from his private case-book that had returned for a second examination in periods varying from two to sixteen years. The eyes examined were free from disease of any

kind, and the patients made no ocular complaints that were not referable to defects of refraction. He called attention to the following conclusions: Among the 400 eyes there were 249 hyperopic, of which 94 showed no change, and 114 myopic, of which 37 showed no change; 141 showed increase in their refraction and 119 decrease, thus verifying the accepted observation that the tendency to increase in refraction is exhibited in more eyes than a tendency to decrease. Among the hyperopes there were 69 decreases and 180 increases, while among the myopes 8 only decreased and 107 increased. Of the 34 eyes with mixed astigmatism, 21 changed in their refraction, the majority demanded an increase in the strength of the glasses needed for the correction of both the principal meridians. The 200 patients represented an equal number of the male and female sex, and the changes found were almost equally divided between them. Occupation had only a very slight influence upon the increase or decrease in refraction. High grades of defect had a less tendency to change in their curves than medium or low defects, and increase of refraction was greatest in the third decade of life, and after the thirtieth year the proportion of increases showed a rapid decline. The decrease of refraction was at its minimum in the fourth decade, and most marked in the sixth, although found to exist at all ages.

Discussion.—Dr. Randall stated that probably a close examination of the cases in which the rapid decreases in refraction occur would show that they did not extend over a series of years, but on the contrary, occupied a comparatively short time, and might be traced to irregular action of the ciliary muscle and temporary loss of relation between the accommodation and convergence.

Diffuse Punctate Condition of the Fundus.—Dr. Edward A. Shumway reported the case of a coloured woman, 35 years of age, married, who had shown the condition seven years. There was a marked family history of migraine, aggravated in her case by long ill-health. The entire fundus in both eyes was studded with closely aggregated, dull, yellowish-white spots, soft in outline, varying in diameter from that of a retinal vessel to several times this size. There were no pigment deposits in the retina, nor any areas of choroidal atrophy. The vision with correction: O.D. $\frac{2}{3}$, O.S. $\frac{6}{7-8}$. Fields showed no contraction or scotomata. No history of night-blindness. They were thought to be due to a colloid change in the cells of the retinal pigment layer.

WILLIAM M. SWEET,
Clerk of Section.

ADVANTAGES OF STRONG PORTABLE MAGNETS IN EYE SURGERY.¹

BY J. A. LIPPINCOTT, M.D.

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HAAB'S introduction of the magnet which bears his name was a very important advance in the methods of removing particles of metal from the interior of the globe. The electro-magnets of Hirschberg and Bradford, and even the small permanent magnet devised by Gruening, had proved of undoubted service in this department of ocular surgery, and I, like others, have successfully used them in very many cases. But not infrequently their traction power was found inadequate. The giant magnet has demonstrated the value of force, and the great usefulness of the instrument is apparent. Its comparative immobility, however, even with recent improvements, in my judgment constitutes a serious drawback. This is especially true from the point of view of diagnosis, particularly with reference to the location of the foreign body.

In 1896 I had Mr. F. F. Howe, of Pittsburg, make for me a magnet with high drawing power, and at the same time small enough to be readily manipulated when suspended from the ceiling of my operating room. The instrument which he then made is 12 ins. long and $2\frac{1}{2}$ ins. in diameter. Into the end of the core,

¹ Read at the meeting of the American Ophthalmological Society, May, 1900.

which is $\frac{7}{8}$ in. in diameter, can be screwed the tips belonging to the Hirschberg magnet. Of these I use two, a short tip 1 in. long and with a flattened point $\frac{3}{16}$ in. one way, and $\frac{1}{16}$ in. the other; and secondly, a long tip $1\frac{1}{2}$ ins. in length and terminating in a rounded point $\frac{1}{16}$ in. in diameter, small enough to be introduced into the globe if necessary. With this magnet I have lifted a mass of iron weighing 51 lbs. The iron was in contact with the end of the core. At the end of the short tip the pulling strength is 4 lbs., and at the end of the long tip $\frac{1}{2}$ lb. A bit of iron weighing 5 grs. was held to the core with a force equal to 20 ozs., to the short tip with a force equal to $15\frac{1}{2}$ ozs., and to the long tip with a force equal to $2\frac{1}{2}$ ozs. The same piece of iron suspended by a string is attracted horizontally from a distance of 3 ins. from the core, $2\frac{1}{4}$ ins. from the short tip, and $1\frac{1}{4}$ ins. from the long tip.

The instrument weighs nearly 9 lbs., and is therefore too heavy to be easily manipulated without other support than that afforded by the unaided hands. Suspended, however, by a wire cord attached to its centre and passing through two pulleys in the ceiling, and balanced by a counter weight at the other end of the cord the instrument can be handled with a minimum of effort and can be held in any desired position while operating. Among the advantages of such a magnet as this, or the beautiful instrument described by Dr. Johnson in the *Archives of Ophthalmology* for May, 1899, are in the first place that the presence of the metal in the eye can usually be diagnosed, and its location, actual or approximate, frequently determined; and this without the loss of time required by the use of the Roentgen ray apparatus. I fall back upon the latter, however, in suspicious cases in which, nevertheless, the magnet gives no sign. These cases are rare in my experience.

In making a diagnosis with the magnet the signs upon which reliance is placed are (1) a sensation of pain or discomfort elicited, and (2) a perceptible movement of the ocular tissues produced when the instrument is brought sufficiently near the foreign substance in the eye. The first of these phenomena is manifested in the great majority of cases in which the foreign body is situated elsewhere than in the lens. When it is in the lens there is no sensation, but movement can usually be observed on close examination. If the substance is in the iris or immediately behind it, both sensation and movement are exhibited. With the object of attaining greater accuracy in locating the foreign body, I have had a telescopic tip made with the object of reducing the strength of the magnet to the point at which the minimum of either pain or movement, or both, can be elicited. If the tip is moved in gradually diminishing circles, we can frequently settle on a small area within which either sensation or movement is most pronounced. During the examination the patient is instructed to hold the eye in every possible position. By strong rotation of the globe upwards, downwards, outwards and inwards, the posterior quadrants can be satisfactorily investigated. I have not used the Haab magnet, but its size obviously makes such refinement of diagnosis difficult if not impossible.

Cases occasionally occur in which the foreign body is so small that the X-ray test must, in the nature of things, be negative. It is needless to say that to use the magnet for diagnostic purposes, accurate and painstaking observation is often necessary. I have sometimes failed, generally owing to insufficient light, to make a positive diagnosis at the first trial.

Occasionally the test is entirely negative. In one instance (Case 13) the approach of the magnet caused no pain, although there was a thin strip of steel 20 mm.

long and $1\frac{1}{2}$ mm. wide in the globe, one end having penetrated the posterior inner wall. Notwithstanding the failure of the test in this case enucleation was at once advised without even waiting for an X-ray examination, because the vision of the other eye was already seriously compromised, the ophthalmoscope revealing a pronounced sympathetic inflammation of the optic nerve and retina. While cases of this character show that the magnet test has its limitations, and that, when negative, it is not to be regarded as final, they by no means detract from the value of the positive evidence so frequently and so promptly furnished by the instrument.

The movable magnet has also some advantages in operating, e.g., when general anæsthesia is necessary, or when for any reason the recumbent position is deemed advisable. In many of my cases the metal was situated in the lens, which was cataractous. In most of these cases a corneal incision was made large enough to permit of the removal of the lens, and also of a small iridectomy where there was adhesion of the iris to the lens capsule—so frequently met with in these cases. Such operative work is in my judgment most easily and safely done in the reclining or recumbent position; and I think it important to bring the magnet within working distance as speedily as may be after the completion of the cut. In almost any case it will be found more convenient to move the magnet to the patient than the patient to the magnet. It is a case of Mahomet and the mountain, and the patient may from timidity or some other cause find it difficult to play gracefully the rôle of Mahomet.

A brief account is given below of the cases, fourteen in number, in which the magnet was used for diagnostic and operative purposes during the past year. I limit myself to this period because I do not wish to make the paper too long, and also because my

assistant has during that time carefully preserved all foreign bodies removed; and the records, especially with regard to measurements, are therefore more complete. In ten of the cases the metallic particle was situated in the anterior part of the globe. Nine of these were operated upon with good results. In one, a boy of 11, operation was refused by the mother, although the presence of iron or steel in the eye was demonstrated beyond the possibility of doubt.

Of the four cases in which the metal had lodged in the vitreous chamber, the only one which could be expected to end very favourably is too recent to give the result. One of the remaining three required enucleation on account of sympathetic neuro-retinitis. The two others recovered quantitative vision with "quiet" eyes. I may say that my observation goes to show that a piece of metal with impetus enough to go through the cornea and lens is usually large enough to do irreparable damage to the eye. When to the size of the object is added the increased danger of infection of so receptive a medium as the vitreous, it must be obvious that the cases in which useful vision is retained, after the extraction of foreign bodies from the vitreous chamber, may be regarded as affording just grounds for congratulation.

FOREIGN BODIES IN ANTERIOR CHAMBER.

CASE 1. May 9, 1899. *Bit of steel 1 mm. long and $\frac{1}{2}$ mm. wide in lens and covered by adherent iris. Diagnosed and removed with magnet.*—G. G. B., farmer, aged 54, while putting a hoop on a barrel seventeen days before, was struck in left eye with something which flew either from the hoop or from a file he was using at the time. On examination V. was $\frac{1}{200}$: field good. Globe moderately congested. T. normal. Pupil dilated and oval, with long diameter vertical. Posterior synechia at a point midway between centre and outer margin of cornea. Just over this point

a small corneal scar. Lens partially opaque. Eyeball aches at times. Magnet held close to cornea causes discomfort and produces distinct movement of iris in region of synechia. Corneal incision with lance at outer margin. Excision of adherent iris. Magnet brought to wound moved, but did not extract foreign body. Tip introduced promptly effectual. Atropine.

May 16, 1899.—V. = p. l. Lens quite opaque.

April 13, 1900.—Cataract being absorbed, central triangular spot fairly clear. V. with $+ 11 = \frac{10}{100}$ and gradually improving.

CASE 2. May 23, 1899. *Steel splinter $\frac{1}{2}$ mm. square projecting from Descemet's membrane into anterior chamber. Removed with magnet.*—A. B. H., chemist, aged 36, while examining steel, had left eye injured by a flying fragment four weeks previously. V. $\frac{15}{200}$. Small wound near centre of cornea, slightly to inner side, apparently still open and surrounded by a nebulous area. Foreign body with oblique illumination seen projecting into anterior chamber. Eyeball red. Hirschberg's magnet applied without effect. Large magnet instantaneously withdrew the object, which was followed by aqueous. Atropine. Bandage.

June 14, 1899.—V. : L.E. with $- 1$ c. axis hor. = $\frac{30}{30}$. The corneal scar is yellowish from rust.

CASE 3. June 16, 1899. *Piece of steel $\frac{1}{2}$ mm. square in cataractous lens L.E. Lens removed and steel in it. Magnet test failed.* A. K., labourer in steel mill, aged 17, had never to his knowledge received any injury to either eye. Discovered the defective sight in left eye about one month prior to first consulting me (on May 25), through trying to enlist. He remembered, however, that several weeks before that the eye was a trifle red, but without any pain.

Examination revealed a small scar to outer side of centre of cornea. Lens, and especially capsule, opaque, and fundus reflex too faint to make out any foreign body, although V. was $\frac{3}{200}$. Pupil freely dilatable. Projection good. T. normal. Magnet elicited no sensation or visible movement. Skiagraph taken, but not satisfactory.

After spraying the nostrils with permanganate of potassium solution, as is my custom before opening the eyeball for any purpose, the cornea was incised at upper margin and iridectomy performed. Magnet then ineffectually tried. While screwing on a tip which could be inserted into the anterior chamber patient violently squeezed his eyelids, expelling the whole lens, which was found to contain a small fragment of iron or steel in its posterior portion just above the horizontal meridian. The lens was soft. The pupil was quite black and vision was sharp. Healing process prompt and patient left the hospital in a week. No chance to test vision subsequently.

CASE 4. June 29, 1899. *Splinter of steel $\frac{1}{2}$ mm. by 1 mm. in anterior chamber and lens, L.E. Removal of steel with magnet. Development of cataract. Extraction. Good recovery.*—J. W., aged 47, machinist, a few hours before was struck by a flying splinter in left eye. The foreign body, which appeared to be about half the size of a grain of wheat, could be seen sticking by one end into the cornea and by the other into the lens. Latter looks hazy. Anterior chamber extremely shallow.

After cocainising the eye and without enlarging the wound of entrance the magnet was held close to the cornea. For a moment or two no apparent effect. Then, suddenly, the foreign body appeared adhering to the magnet.

A week later, as the eye was quite painful, my assistant, Dr. J. L. Duncan, in my absence, removed the lens, which was much swollen, washing out the anterior chamber thoroughly. The wound healed well; but for a few weeks there remained some pain and increased tension, which finally yielded to eserine.

August 25, 1899.—V.: L.E. + 10 cum + 2 cy. vert. = $\frac{20}{50}$; V. in the other eye was also $\frac{20}{50}$, and not improved by a glass.

CASE 5. August 28, 1899. *Flat bit of steel 1 mm. square in iris, L.E., for nine days. Diagnosed (at second trial) and removed with magnet.*—J. L., machinist, was seen by my assistant, August 26, 1899. He stated that while chipping

steel nine days previously a fragment struck the left eye. The globe was red. T. normal. Pupil dilated. No foreign substance visible. No corneal scar. Magnet test at that time negative, but revealed movement of the lower portion of the iris on the 28th, when an incision was made at the lower corneal margin and the foreign body immediately removed with the magnet.

September 21, 1899.—V.: $\frac{20}{30}$.

CASE 6. October 12, 1899. *Steel splinter 1 mm. by $\frac{1}{2}$ mm. in anterior chamber and attached to cornea. Removed with magnet. Escape of aqueous.*—W. D., aged 36, machinist, while chipping steel six hours before, received a wound in the right eye. The wound was central. The foreign body was distinctly seen in the anterior chamber, one end being still in the cornea. Promptly removed with magnet and followed by jet of aqueous. Next day anterior chamber normal in appearance. Eye looks well and patient discharged at his own request.

✓ CASE 7. December 15, 1899. *Metallic substance in right lens covered by posterior synechia. Magnet test elicited both pain and movement. Operation refused.*—A. B., aged 15, cooper's assistant, was driving tacks in a barrel twenty-four hours previously, when he suddenly felt something strike the right eye. On examination the eye was found red, but not painful. A small linear split was seen in the cornea outside its centre. Edge of pupil torn and adherent at its outer margin. Lens slightly cloudy. V.: $\frac{20}{30}$. On applying the magnet some pain was felt, and a forward movement of the iris was readily seen.

The boy's mother, a stolid and ignorant woman, resisted all the arguments I could bring to bear, and took her son away. I have not been able to trace the subsequent history of the case.

CASE 8.—February 8, 1900. *Piece of steel $2\frac{1}{2}$ mm. square and 1 mm. thick behind periphery of iris. Diagnosed and removed with magnet at second trial, the first having failed through instrument not being in good order.*—C. M., aged 28, steel worker, while sharpening tools on February 5, 1900, received a wound from a hot fragment of steel in the left

eye. The anterior chamber was filled with blood when first examined. Forty-eight hours later, the blood had been pretty well absorbed, but aqueous was a little cloudy. There was a fresh cicatrix, about 3 mm. long, and situated vertically at the upper outer sclero-corneal margin. Opposite this was a very small blackish spot on the iris, which looked as if it might be a foreign body; V.: $\frac{10}{200}$. The eye had been cocaineised by mistake, and no sensation was produced by the magnet, nor was any movement of the iris noticeable. Nevertheless, I made a corneal incision at the site of the wound of entrance, and endeavoured to extract the metal which I was sure was in the eye. Failing with the magnet I tried forceps, but did not succeed. Atropine was instilled and the eye closed. Next day I learned that some one had turned the current on the hospital magnet, and left it on all night, thus making the instrument practically useless. My office magnet, similarly constructed, and of the same power, elicited an instantaneous response in sensation and movement, and on reopening the wound the offending substance was promptly removed. No reaction. Nine days later patient went home with the eye free from irritation. V.: with - 4 cy., axis hor. = $\frac{20}{50}$.

CASE 9.—March 6, 1900. *Thin bit of steel, $3\frac{1}{2}$ mm. by 1 mm. in right lens for two years. Diagnosed and removed with magnet. Cataractous lens extracted. Subsequent discission. V.: corrected = $\frac{20}{50}$.*—J. M., aged 20, while punching horse shoes on April 17, 1898, was injured in right eye. He was seen at that time by my assistant, who tried the magnet for sensation, but did not look critically for movement. Result negative.

When I examined him on March 6, 1900, the eye was slightly congested. Small vertical scar on lower part of cornea. Pupil dilated except at lower margin. Lens opaque and dark in colour. V. — p. l. Projection good. Magnet elicited no pain, but movement of the attached portion of iris could be observed.

Operation.—Small corneal incision. Excision of synechia. Instantaneous withdrawal of steel. Lenticular debris washed out with anterior chamber syringe.

March 27.—V.: R.E. + 12 = $\frac{20}{100}$, capsule opaque.

April 4.—Free discission.

April 12.—V. with + 12.5 = $\frac{20}{30}$.

CASE 10. April 10, 1900. *Very minute bit of steel, $\frac{1}{4}$ mm. in length, buried in lens. Diagnosis made and removal effected with magnet at second trial, the first having been negative.*—C. B., aged 22, had his right eye hurt slightly thirteen days before while drilling holes in steel cars. His vision was good until six days after the accident. Patient first presented himself on April 5. There was then very slight congestion of eyeball. No pain. Pupil normal. At lower pupillary margin a little to the nasal side was a very dense pinhead opacity of the lens capsule, which spread out into a general lenticular diffused haze. Under intense focal illumination a very small scar was found in the cornea over the seat of the opaque spot in the lens capsule.

V.: R.E. = $\frac{20}{200}$, not improved by a glass. L.E. $\frac{20}{80}$, and with $-2.75 = \frac{20}{30}$. Magnet test on that day did not develop pain, and no movement was perceived. But the light was not good—Pittsburg, like Sheffield, is not always blessed with Italian skies—and I was not satisfied. Patient was given a weak atropine solution and was requested to return in a few days.

April 10.—Lens a little more opaque, otherwise no change. Magnet test again tried. This time the light was good, and when the tip of the instrument was held close to the cornea and the current turned on and off, an extremely slight but unmistakable to-and-fro movement of the capsular opacity was made out.

The patient at once submitted to an operation and the particle was removed through a small peripheral corneal incision, the slender tip of the magnet being introduced for that purpose into the anterior chamber and moved up close to the fragment.

FOREIGN BODIES IN VITREOUS CHAMBER.

CASE 11.—Sept. 23, 1899. *Piece of steel, $4\frac{1}{2}$ by $2\frac{1}{2}$ mm. and $1\frac{1}{2}$ mm. thick, in the vitreous chamber, diagnosed and removed by means of magnet. Resulting vision = p. l.*—J. B., aged 22,

machinist, was injured by a flying bit of steel thirteen hours before. There was a pretty large wound in the inner lower ciliary region, and the pupil was drawn towards the seat of the injury. The eyeball was congested. The magnet, in the hands of my assistant, promptly elicited pain.

A few hours later the wound was enlarged and the metal easily removed with the aid of the instrument. Suture applied.

Ten days later eye looks well. Pupil round. Retina extensively detached. V. = p. l.

February 9, 1900.—Eye quiet. Pupil almost perfectly round and freely movable. V. seemed a little improved. Counts fingers doubtfully. R.E. = $\frac{20}{20}$.

CASE 12.—October 14, 1899. *Fragment of steel, 8 mm. square by 3 mm. thick, in the vitreous chamber. Diagnosed and removed with magnet. Preservation of eyeball but not of useful V.*—R. McA., aged 45, was struck in the right eye two days previously with a flying bit of steel.

On examination the eyeball was highly œdematous and very tender. Pupil contracted. Large irregular scar to the outer side of cornea. V. = p. l. The vision of left eye, which, according to patient's statement, had been blind for over four years, was also limited to p. l., and ophthalmoscopically this eye showed a rather dense opacity of the vitreous. The patient complained of pain immediately on the approach of the magnet to the injured eye.

After re-opening the entrance wound with a Graefe knife, the foreign body was drawn out by the magnet.

January 9, 1900.—Vision in each eye was p. l. The right eyeball was free from irritation, but tension was somewhat reduced. The pupil was small and oblong, and drawn towards the corneal scar. Light projection poor on both sides. Iodide of potassium prescribed.

March 6.—Patient thinks vision in both eyes improving, but evidently the wish is father to the thought.

CASE 13. March 10, 1900. *Strip of steel, 20 mm. long by $\frac{1}{2}$ mm. wide, in vitreous chamber and protruding through*

posterior wall. Sympathetic neuro-retinitis of other eye. Magnet test negative.—A. P., aged 27, was struck in the right eye with a flying fragment while setting dies. On examination a scar was seen running completely across the cornea about 2 mm. below its upper margin. Anterior chamber shallow. Pupil occluded. T. reduced. V. = 0; L.E.: V. with + 9 = $\frac{20}{100}$. External appearances perfectly normal, with the exception of a moderate dilatation of the pupil. No ciliary tenderness. The ophthalmoscope showed clear media. Inner margin of disc and adjacent retina markedly striated. Surface of disc hazy, as is also the retina for a considerable distance from the disc. The swelling of the retina is rather more pronounced than that of the disc, the latter being most clearly seen with + 6 D., while the former is best examined with + 8 D. Retinal veins tortuous and about one-third of normal calibre. Arteries size of coarse threads. The magnet produced neither pain nor visible movement. The test might perhaps have been more carefully tried and with positive results, but on account of the sympathetic trouble in the other eye the necessity for enucleation was so evident that persistent examination was deemed unnecessary. For this reason also skiagraphic investigation was thought superfluous. Enucleation was performed, when a piece of steel of the dimensions above stated was found in the vitreous; the patient was put upon iodide and salicylate of sodium and muriate of pilocarpine.

April 4.—Vision slightly improved, although there is now a slight opacity of the vitreous.

The case is still under treatment.

CASE 14. April 27, 1900. Fragment of steel, $4\frac{1}{2}$ mm. by $2\frac{1}{2}$ mm., in upper part of vitreous chamber, accurately located and removed with the magnet. A good visual result probable.—J. C., aged 23, boiler-maker's assistant, while chipping steel, felt something strike the left eye; the accident happened three hours before I saw the patient. On examination, a small wound was visible to the nasal side of the middle of the upper lid and $\frac{1}{8}$ inch above its free margin. Another wound, about 2 mm. in diameter,

was seen in the globe 5 mm. from the inner margin of the cornea and just above the horizontal meridian. The eye was slightly suffused. Pupil normal. V. = p. 1. Ophthalmoscopic examination showed some streaks of blood running towards the upper part of the globe, in which region there was what seemed to be a flat hæmorrhagic extravasation lying close to the retina. On moving the magnet tip round the globe sensation was quickly evoked, and a slight movement of the sclera observed at a point situated 1 cm. above the upper corneal margin and about 4 mm. to the outer side of the vertical meridian. A vertical incision in the conjunctiva was made in this region, the edge of the superior rectus held aside and the sclera exposed. After further cocaineisation and the free use of bichloride solution 1—4,000, a somewhat oblique incision was made in the sclera as suggested by Knapp. The magnet tip being now held close to the wound, the foreign body was soon withdrawn. No loss of vitreous.

April 30.—Patient has been perfectly comfortable. Eye free from congestion. Counts fingers at 6 inches in candle light, and is improving every day.

REVIEWS.

D. GROMAKOWSKI (Kiew). A Contribution to the Bacteriology of Follicular Diseases of the Conjunctiva. *Archiv für Augenheilkunde*, xli.-ii. 1900.

Gromakowski has examined bacteriologically 70 cases which came under his notice at the Eye Department of the Military Hospital at Kiew between November, 1898, and July, 1899. The examination comprised microscopical and bacteriological examination of the conjunctival secretion and of the follicular contents. Clinically he classifies the cases as follows:—

(1) Follicles limited to fornices; chronic conjunctival hyperæmia.

- (2) Follicles also on the tarsal conjunctiva; chronic.
- (3) Acute development of follicles.
- (4) Trachomatous conjunctivitis, with more or less evident thickening of conjunctiva; extensive formation of follicles; muco-purulent secretion.

Class I. included nine cases in which there were small, round, yellowish-grey swellings limited to the conjunctival fornices.—These were expressed, and though various staining methods were tried, the contents revealed no bacteria. Cultures in one tube (case 1) gave a growth of diplococcus albicans amplius (Buhm). In no case were bacteria found in the expressed lymphoid cells; in a few preparations rods or cocci were found between the cells.

In the case of three patients only were cultures obtained. In one of these micrococcus albus liquifaciens and bacilli of the pseudo-diphtheritic group were found (under this latter group he includes pseudo-diphtheritic bacillus, bacillus septatus of Gelpke, and xerosis bacillus). In another case pseudo-diphtheritic bacilli alone were found; in the third the same with sarcina aurantica.

In two cases the contents of the conjunctival sac were examined before the expression of the follicles, and the same micro-organisms were obtained on culture. The conjunctiva of animals not being susceptible to the micro-organisms which are pathological for the human conjunctiva, no attempt was made to inoculate the cultures. So no specific bacterium was found for this group of cases. The cocci and rods found must be regarded as only chance occupants of the conjunctival sac, and lying hid in its minute folds were not to be got rid of.

Class II. Superficial chronic follicular conjunctivitis.—White spots on the tarsal conjunctiva, yellowish-grey swellings in the fornices; secretion absent or only slight: there were eleven cases presenting such conditions. No micro-organisms were found in the follicle contents or conjunctiva; no cultures developed. When there was conjunctival secretion, white staphylococci were found and also pseudo-diphtheritic bacilli.

Class III. Eleven cases presented superficial follicular

conjunctivitis beginning acutely, *i.e.*, acute catarrh with follicles.—In eight, the small bacillus similar to Koch-Weeks bacillus was found; both in morphology and manner of growth on nutrient media Gromakowski thinks this bacillus identical with the Koch-Weeks' bacillus of contagious conjunctivitis; it also recalls the influenza bacillus. It occurred as short, slender, straight rods, with rounded ends in the pus-cells and in the mucus; length 0·8 to 2 mikro-mm. With watery methyl-violet the edges stained more deeply than the centre. Pure cultures were obtained in seven out of the eight cases. In the first days of the affection they were met with in the secretion in great numbers, becoming fewer as the secretion lessened. In addition, colonies of pseudo-diphtheritic bacillus also usually developed, and in some the white staphylococcus. The pseudo-diphtheritic rods are darker, and markedly thicker. In two cases they alone were found; in one, in association with micrococcus tetragenus and micrococcus flavus liquefaciens. ✓

Class IV. Deep follicular inflammation of conjunctiva.—The characteristics of this group are thickening of fornices and tarsal conjunctiva, the presence of vegetations, large follicles in the fornices, follicles appearing like white spots on the tarsal conjunctiva, and considerable muco-purulent secretion. Of this there were forty-two cases. In fifteen, rods similar to Koch-Weeks' bacillus were found. In some cases they were present over a space of two to six weeks in the secretion—the more acute the process, the more numerous the rods; pseudo-diphtheritic rods were associated with them; as the inflammation lessened white staphylococci appeared, and were also present in the less acute cases. In seventeen the virulent white staphylococcus (and pseudo-diphtheritic rods) were found; in two the streptococcus was found in the secretion for a period of one week; in one the Fränkel-Weichselbaum pneumococcus; in one micrococcus tetragenus; in five the pseudo-diphtheritic bacillus only.

The Koch-Weeks' bacillus, the cause of epidemics of contagious conjunctivitis, has been said never to be asso-

ciated with follicular inflammation of the conjunctiva, and Gromakowski thinks that in most cases the presence of follicles could be determined prior to the onset of the infection with the bacillus. Nevertheless, in one of his cases (case 27), though there were a few follicles before the onset of the acute inflammation, diffuse follicular formation resulted on the acute symptoms developing (rods being present), and as the rods in the secretion diminished so did the follicles disappear. Certain other of his cases also show that in some circumstances the conjunctiva can react to infection by these bacilli, even along with follicle formation.

What is the significance of the staphylococcus? It is well known that it is often present in the normal conjunctival sac. Gromakowski examined twenty normal conjunctival sacs, and in eleven the staphylococcus was present along with other microbes, but only from one to three colonies developed on making cultures, whilst in the case of trachoma the number of colonies was very striking. The conclusion from this is, that given favourable circumstances the staphylococcus may develop considerably in the conjunctiva between the follicles, and the toxin produced has some action on the eye. (Thus Soloweiff showed¹ that the toxin induces a catarrh, while streptococcus toxin calls forth a much stronger inflammation.) And just as in lacrimal obstruction the streptococci and staphylococci present in the lacrimal sac set up dacryocystitis, so it is possible that in trachoma there is a connection between the growth of staphylococci and the appearance of chronic conjunctivitis.

Gromakowski concludes with some remarks on trachoma and its epidemics. It is apt to occur in badly-aired barracks, and in winter, declining in the summer. The negative result of bacterial examinations and inoculations on the human conjunctiva, as well as the possibility of the development of the disease in slight but persistent inflammatory conditions of the conjunctiva, and, further, the

¹ "Dissertation," 1897, St. Petersburg.

spontaneous disappearance of the follicles after removal from dusty living rooms, lead one to seek the occasion of the disease in the irritation from dust and the micro-organisms already existing in the conjunctiva. In epidemics of contagious conjunctivitis, Gromakowski says we see the trouble assuming diverse forms—trachoma in one, follicular conjunctivitis in another, &c. He has seen contagious conjunctivitis pass on into trachoma with pannus. In one regiment in which an epidemic developed, of sixteen cases of acute follicular conjunctivitis, bacilli similar to Koch-Weeks' were found in thirteen; in others the clinical picture was that of acute conjunctivitis, and the same bacilli were found. When inflammation is subsiding another infection may occur from staphylococcus pyogenes albus. He thinks that trachoma may be the expression of the reaction of the conjunctiva to infection by different pathogenic micro-organisms. In the majority of cases, however, it depends on the pre-existence of follicles and the supervention of acute or chronic conjunctivitis. In such cases the follicles probably depend on slight, long-continued conjunctival irritation, the acute catarrh being due to an infection by the Koch-Weeks' bacillus, &c. The chronic conjunctival affections which *follow* follicular disease are, to all appearances, due to pyogenic microbes, *e.g.*, staphylococcus, streptococcus, &c.

W. WATSON GRIFFIN.

JOHN E. WEEKS (New York). An Operation to render possible the Wearing of an Artificial Eye. *New York Eye and Ear Infirmary Reports. January, 1900.*

Plastic operations of this sort fail usually, not because of failure of the grafts to "take," but because of inability to maintain the original area of the flap. Weeks has found that the skin flap without pedicle (Wolff flap) shrinks comparatively little where attachment to fixed points can be secured for a number of weeks. He reports two cases

in which the following operation was done with success, no attempt being made to establish more than one *cul-de-sac* at any one sitting.

The lid to be operated upon, including the tarsus and the fibres of the orbicularis palpebrarum muscle, was freely detached from the tissues to which it was adherent, in such a manner that a groove was formed corresponding to the original conjunctival *cul-de-sac* and extending almost to the margin of the orbit. The palpebral fissure (which in both cases was too short to permit of free access to the groove formed by liberating the lid) was elongated by making a free canthotomy. All bleeding was then stopped. A Wolff flap, large enough to line the groove on both sides, was then dissected from the inner surface of the arm, after which the flap was freed from all subcutaneous tissue which was still adherent. (The flaps were nearly oval in shape and measured $1\frac{3}{4}$ by $1\frac{1}{2}$ inches in diameter.) The flap was kept warm by placing it in a warm normal saline solution until transferred to the groove which was to receive it. Folded in its long axis with the epithelial surfaces in apposition, the flap was conveyed to the groove, where it was carefully adjusted so that all the denuded surface was covered. The needles of a double-armed suture were passed through the flap at the bottom of the groove at a distance of 2 or 3 mm. apart, engaging the periosteum at the margin of the orbit and emerging on the cheek (or brow when the upper lids were operated upon), and the ends of the suture were tied over a pledget of gauze. Two such sutures were passed through each flap, one at the union of the inner with the middle third, serving to draw that part of the flap to the bottom of the groove and to attach it to the periosteum, or to the tissue immediately above the periosteum. After having anchored the flap to the bottom of the groove, the edges of the flap were sutured to the border of the fresh surface at the margin of the lid, and along the edge of the remnant of conjunctiva covering the orbital tissue (or stump). When all was secure, a suitable shell was introduced to aid in keeping the flap well spread out, and to keep the fresh

surface of the flap in contact with the fresh surface of the groove. All was done under strict antiseptic precautions. The shell was lubricated by means of bichloride vaseline 1 in 5000. The eye was then bandaged, and was not disturbed until the end of four days, when the flap had united to the underlying tissues.

In this operation the periosteum at the margin of the orbit is utilised as one of the parts to which to fix the flap. The edges of the lids may be kept in apposition until the tendency of the palpebral half of the flap to shrink has passed; the orbital half of the flap is kept from shrinking very much by the traction from the opposing flap.

The question of a suitable shell is important. In the cases referred to, the shell was made from the ordinary rubber tissue. About sixteen layers of the tissue were made to adhere together by dipping the folded mass in warm water and then employing pressure. The plate thus formed could be cut to any desired size and moulded to suit the requirements. Such a shell is sufficiently firm and may be worn a long time without trouble, when suitably cleansed.

E. J.

OPHTHALMOLOGICAL SOCIETY OF PARIS.

APRIL, 1900.

Syphilitic Chancre on the Bulbar Conjunctiva.—M. Morax. In this case a young married woman appeared to have been infected by a child (not her own) which she was bringing up by hand. Situated in the neighbourhood of the plica semilunaris was a slightly raised whitish patch covered with a "diphtheritic" exudation which could not be removed by slight friction. The cornea was not involved, but the preauricular and retromaxillary glands were enlarged. The child which the woman was nursing was still suffering from a rhinitis, and presented a discrete roseolar eruption with slight pigmentation. Two months before, this child had been treated with mercury at the Hôpital des Enfants for a general rash.

A long discussion followed, chiefly concerning the questions

whether the woman should be told the nature of the disease by which she was attacked, and the method of her infection.

The balance of opinion was decidedly in favour of enlightening the woman as to the true nature of her disease and its dangers. As regards telling her the method of infection opinions varied, as it was pointed out that it would be difficult to prove with certainty that the infection came from the child. The conduct of the child's parents in not informing the nurse of the disease from which their child was suffering was severely criticised.

Gonococcic Thrombosis and Phlebitis of the Retina. — M. Galezowski. For several years past, M. Galezowski has paid particular attention to ocular thrombosis, and has shown by many instances that the sudden loss of vision, generally attributed to a morbid coagulum from the heart or aorta, is in reality only provoked by an obliteration of the retinal vessels themselves, whence come partial or total thromboses affecting the optic nerve or retina.

M. Galezowski pointed out that this view had received support from the researches of Koenig, Martin, Leyden, Wertheim, Potain, &c. The last has pointed out that a gonococcic aortitis may arise in the course of gonorrhœa, granulating ulcers on the inner surface of the aorta with collections of gonococci are formed, and from these, exudations into the general circulation. If the aorta and the heart can be attacked by the gonococcus, there can be nothing more natural than to connect the retinal thromboses with gonococcic inflammations of a similar nature amongst individuals suffering from gonorrhœal complications, be they joint or other affections.

The case to which M. Galezowski drew attention was that of a man who had suffered from a gleet for ten years and occasional rheumatic crises sometimes in the right arm, sometimes in the right knee. His heart was normal. The loss of vision was sudden and was accompanied with all the signs of thrombosis. The treatment was that recommended by Potain, viz., salicylate of quinine, lithine, alternate applications of hot and cold to the eye by caoutchouc bags, and alternate collyria of eserine and duboisine. The last two proceedings were intended more particularly to render the circulation in the affected eye as free as possible. This treatment gave good results, for only a peripheral scotoma was left corresponding to the thrombosed vessel.

M. Dreyer-Dufer thought that inspirations of nitrite of amyl were better than the hot and cold applications.

Critchett's Operation and Sympathetic Ophthalmia. — M.

Chevallereau. A woman, aged 36, suffering from a staphyloma affecting the whole anterior half of the right eye from infancy, was operated on by M. Chevallereau. The operation (chiefly done for appearance's sake) was a modification of Critchett's. The conjunctiva was dissected up freely and a silk (No. 4) suture passed as a purse-string through it and left untied. Then five long half-curved needles, threaded with catgut, were passed from above downwards through the sclerotic just in front of the line of the insertion of the recti muscles. A transverse incision was then made with a von Graefe knife across the centre of the staphyloma, reaching as far as possible to the outside and to the inside. The upper and lower semielliptical lips were then removed by a curved scissors. In consequence, there was left an elliptical opening with a transverse axis about half as long again as the vertical. The five needles were then wholly pushed through and the catgut sutures tied. The purse-string suture of the conjunctiva was then tied. There was no inflammatory reaction, the stump was rounded and remained of the same size. Until three weeks after the operation all was well. Then the patient returned to hospital (she had been discharged three days before) with a well marked irido-cyclitis of the other eye. Under the treatment of subconjunctival injections of cyanate of mercury, atropine collyria, and mercurial inunctions, the eye ultimately recovered, though it had 1 D. myopia, so as to have an acuteness of vision equal to $\frac{1}{4}$ without correction, but M. Chevallereau felt bound to enucleate the stump (the exciting eye) at an early period.

M. Chevallereau lays stress on removing an elliptical (not a circular) piece of the staphyloma in the way pointed out above, and the conjunctival purse-string suture as giving the most rounded stump possible. He pointed out that he had given up evisceration, because of the manner in which the globe shrivelled up after it, in favour of Critchett's operation, and that now he was more in favour of de Wecker's operation. This merely consists in dissecting up the conjunctiva, passing a silk purse-string suture, then removing the cornea and tying the suture. The great drawback was that the suture generally cut through, but a great advantage was that one did not touch the ciliary zone.

M. Vignes prefers evisceration to enucleation and reserves the latter for cases of panophthalmitis. For partial amputations he dissects up the conjunctiva and cuts away the cornea and sclerotic behind the limbus, then tying the conjunctiva by interrupted sutures.

M. Darier had been a strong partisan of Critchett's operation, but having had a case four years ago, in which sympathetic

ophthalmia had followed the operation, he was not now so favourable to it. He had succeeded in preserving the patient's sight, so that it was now between $\frac{1}{2}$ and .

M. A. Terson pointed out that Van den Bergh and Carter had reported cases of sympathetic ophthalmia after ablation of staphylomata. He thought that partial amputation of a staphylomatous eye should never be performed unless that eye had gone through a stage of absolute glaucoma. On no eyes with subnormal tension should this operation be performed; enucleation should be reserved for them, and evisceration for cases of panophthalmitis. He briefly reviewed the history of the various operations performed for the cure of staphylomata—ranging from total excision of the globe to excision of a very small piece of the cornea. In his opinion, one should never pass the limbus in one's incision, and ordinarily one should keep two millimetres in front of it, and should reserve the operation for eyes which have passed through a stage of absolute glaucoma.

M. Valude objected to the use of the conjunctival purse-string suture, preferring interrupted sutures for that purpose.

New Note on Ocular Analgesics, and on Dionine in Particular.
—M. Darier. The three best ways of using dionine are: by subconjunctival injection (one centigramme of a 5 per cent. solution), or instillations of a 5 per cent. solution into the conjunctival sac, or placing some of the powder on the conjunctiva. The 5 per cent. solution is the most stable. The subconjunctival method is, perhaps, the best, but some patients object to it. As regards the differences between the various salts of morphia, M. Darier thought that morphia itself, though an analgesic when dusted into the eye, gave rise to alarming symptoms of intoxication occasionally. Heroine (diacetic ether of morphia) was nearly the equal of dionine in usefulness, but as it is very insoluble, he preferred to employ the more soluble chlorhydrate. Still this drug also gave rise to alarming symptoms and so he gave up its use. Codeine in 5 per cent. solution was not stable, nor analgesic, so he did not use it. Acoine in powder has a caustic action. In 1 per cent. solution it has an analgesic effect even in cases in which dionine has lost its power. When cases of intoxication follow the absorption of three or four drops of heroine (for example) by the conjunctiva, M. Darier thinks that the drug must be absorbed by the ocular lymphatic spaces and be conveyed thence to the cerebro-spinal fluid.

M. de Spéville could not speak of dionine from experience, but acoine had proved itself a very useful analgesic in his hands, especially as a hypodermic or sub-conjunctival injection.

M. Darier, in reply, agreed that acoine was an especially useful analgesic when one wished to inject mercurial solutions. Cocaine was too toxic for such a purpose.

FRANK C. CRAWLEY.

MAY, 1900.

Annales d'Oculistique, June, 1900.

Dermoid Cyst of the Orbit.—M. Vignes.

Molluscum Contagiosum.—M. Aubineau.

The Cerebellar Origin of certain cases of Strabismus.—M. Dor described what he had observed in the case of a rabbit with a congenital strabismus deorsumvergens of the right eye. The squint was not paralytic, for there was no lack of movement in any direction, but the head was carried turned to the right and twisted to the left, and there appeared to be a tendency to rotation of the whole body to the right about an antero-posterior axis. *Post-mortem*: There was found distinct atrophy of the right flocculus and left lateral lobe; the motor nerves of the eye appeared to be healthy. The facts seemed interesting in view of the lesion being congenital and of the existence of a squint which might be described as concomitant (in an animal).

Subsequent speakers were unable to perceive the analogy between this condition and concomitant strabismus.

Epithelial Cysts of the Conjunctiva.—M. Dubois de Lavigerie found in the person of an elderly man, who consulted him regarding a small phlyctenule, a large number of yellowish, opalescent grains of small size, situated symmetrically in the *culs-de-sac*. These were closely packed and raised up the conjunctiva somewhat, but had caused neither hyperæmia nor pain. There was no excretion and no history of previous conjunctivitis. These were found to be extremely small cysts, covered and separated from one another by delicate membrane. Where the cysts were larger, the epithelial layer over them was extremely thin, even in some parts unicellular. Some of them contained epithelial and granular *débris*, but others simply a fluid apparently free from albumen. These ought not to be confused with serous cysts, which are attributed to distension of the lymphatics, nor with those formed in Krause's or the lacrimal glands; these are epithelial also no doubt, but their dimensions are always much greater.

COLLEGE OF PHYSICIANS OF PHILADELPHIA,
SECTION ON OPHTHALMOLOGY.

MARCH 20, 1900.

Bilateral Enlargement of the Lacrimal Glands.—Dr. W. C. Posey exhibited a case in a coloured girl, aged 12 years. She was probably of scrofulous diathesis, having been treated some years previously for phlyctenular ulceration of the left cornea. The swelling in the upper lids had been noticed for two weeks while the child was apparently in good health. There were no signs of active inflammation about the eyes, but both upper lids presented an abnormal degree of fulness which was found on palpation to be occasioned by the presence of firm elastic bodies, almost symmetrical and slightly roughened on their edges, occupying the position of the lacrimal glands. There were no glandular enlargements elsewhere.

Synchysis Scintillans.—Dr. A. G. Thomson exhibited a marked case occurring in the right eye of a woman, aged 45 years. Instead of the usual flakes floating in the vitreous, the cholesterine crystals extended in all directions, and when examined by the ophthalmoscope had the appearance of fine branches of a tree covered with snow.

Discussion.—Dr. Oliver showed a water-colour sketch of a case of cholesterine crystals in the superficial layers of the retina, accompanied by chorio-retinal changes in the macular and circum-papillar regions, occurring in an apparently healthy male subject of 18 years of age.

Traumatism from the Lash of a Whip.—Dr. Charles A. Oliver exhibited a case which was seen a few minutes after the accident. Vision was reduced to one-half of normal, and the fields of vision were somewhat contracted concentrically. Ten days later the eye-ground showed an isolated curvilinear rupture of the choroid in the macular region. The crystalline lens was slightly dislocated, and there were some vitreous opacities.

Iridectomy with Removal of Lens Capsule and Lens Débris in a Case of Blindness of more than Thirteen Years' Standing.—Dr. Oliver gave a detailed account of a case. The patient had both eyes rendered useless by a mining explosion. The left eye had become blind and shrunken. A large field of good light-perception in the quiet right eye gave promise of a betterment of his condition, and the procedure noted above was attempted, the results being a permanent vision of $\frac{5}{25}$.

Discussion.—Dr. de Schweinitz referred to the case of a man, aged 75, who had been blind for many years, the right eye having a large corneal macula, nearly central, and a ripe cataract, and the left eye presenting a large leukoma with adherent iris and opaque lens capsule, the result of a knife thrust in childhood. The extraction of the lens in the right eye gave vision of $\frac{10}{200}$. In the hope of benefiting the vision of the left eye, which had been blind since the accident, an iridectomy was performed and a portion of the iris with the attached shrunken lens removed. Vision with a +18 D. lens equalled $\frac{20}{200}$. Dr. Harlan instanced a case in which useful vision had followed an operation thirty-three years after the accident that had destroyed sight. Dr. Risley said that the time intervening between the operation and the original injury was an important factor in the successful results achieved in these cases. The good vision secured, he believed, was due to the late day at which the operation was performed, when the eye had settled into a quiescent state, and was better than if the attempt were made shortly after the injury, when the eye was in an irritable condition.

The Relation of Tenon's Capsule and the Check Ligaments to Enophthalmos.—Dr. W. T. Shoemaker called attention to the firm attachment of the fascia to the periosteum at the orbital margin, and at the optic foramen, forming primarily a cone of fascia from which subsidiary extensions issue, investing more or less completely every structure within the orbit. Within this cone rests the eyeball, further supported by its individual investing membrane—the Tenon's capsule proper of some anatomists. This fascia is divided into two portions, the posterior of which invests the posterior hemisphere of the eyeball and receives a direct attachment from each of the check ligaments, thus forming a sling passing around the eyeball with its anterior attachment at the orbital margin. The check ligaments contain smooth muscular fibres, discovered by Sappey, which are under sympathetic innervation. The orbital fat and cellular tissue can only act as a cushion or buffer and not as a fulcrum around which to change the direction of the applied forces, and it is only bony tissue which can act in this way. The theories thus far advanced for the causation of enophthalmos are in effect the same in that they depend upon an actual or relative increase in the orbital capacity. Discussing the sympathetic theories, both the absorption theory of Beer and that of paralysis of Mueller's orbital muscle, he asked if the lesion causing the pathological condition in both these theories could not also cause paralysis and nutritional disturbances in the smooth muscle of the check ligaments, thus

allowing a relaxation of the supporting fascia. The cicatricial theory (Gessner) he thinks untenable in recent cases, for the reason that cicatricial contraction, being the last stage in the inflammatory process, is pathologically not permissible within the short time that enophthalmos often follows injury. Regarding fracture of the orbital walls as held by Lang, Tweedy, Langenbach, and others, to be the cause of this condition, he thinks with Denig that cases of undoubted and extensive fracture, causing a violent and absolute displacement of the eyeball, should be considered as such and not as enophthalmos. Other fractures he thinks more likely to be linear than depressed, and believes they would, theoretically at least, diminish rather than increase the size of the orbit.

In conclusion, it seemed to him probable that the orbital fascia, including Tenon's capsule, is necessary to the maintenance of the eyeball in its natural position: that this fascia may become incapable of performing its function from many causes; that enophthalmos will result from disease or injury of the fascia, if so situated and extensive enough to throw the balance of power in favour of the enophthalmic forces; that this may be the case in paralysis of the smooth muscular fibres in the check ligaments, or in nutrition disturbances leading to atrophy or relaxation of the same; that it may result from traumatic rupture of the check ligaments or the orbital attachment of the fascia, or especially liable would it be to follow rupture of the posterior investing sheath of the eyeball. Finally, as the check ligaments are highly elastic and the whole orbital fascia is fibro-elastic in character, the combined and simultaneous action of the four recti muscles, which rarely occurs, producing spastic enophthalmos, would meet with a physiological protest, but not with prohibition on the part of Tenon's capsule. Likewise the elasticity of the fascia must be reckoned upon in those cases of enophthalmos said by some to follow a combined paralysis of the two oblique muscles.

Dr. Shoemaker instanced the case of a man, aged 32, who received a pitched base-ball directly in the orbital entrance of the right eye. He was knocked down but did not become unconscious, and came under treatment within a short time. The lids were swollen and tense. There was extensive emphysematous crackling extending backward over the temporal fossa, and a demonstrable rupture of the conjunctiva through which air escaped on pressure. The nasal bone at the base was fractured on that side. The orbital margin elsewhere seemed to be intact. The cornea was clear and uninjured; conjunctiva ecchymotic; a small hæmorrhage into the anterior chamber and very faint reflex from

fundus ; vision equalled counting of fingers at 3 metres. Treatment consisted of ice compresses. The following day the lids were less swollen, pupil evenly dilated, fundus clearly seen, and the macula apparently healthy. A little below and to outside of macula was a very faint, crescentic, greyish streak about $1\frac{1}{2}$ disc. diameters in length. Ten days after injury, vision was $\frac{5}{15}$, pupil slightly larger than in left eye, iris reaction to light diminished. Patient did not return for $2\frac{1}{2}$ weeks, when enophthalmos was noticed. Vision unchanged, pupil partially dilated and reacting sluggishly to light, and accommodation much diminished. The crescentic streak near the macula had entirely disappeared. The patient was not seen again for $2\frac{1}{2}$ years, when he presented the following condition : Palpebral fissure same width as on left side, but the fold above the upper lid was much deeper. The eyeball was $2\frac{1}{2}$ mm. lower and had receded within the orbit 2 mm. further than left eye. The pupil was nearly round, larger than that of left eye under like illumination, and the iris showed limited activity to light, accommodation, and convergence ; the movements of eyeball full in all directions. There was also lessened sensibility of skin on right side of face in neighbourhood of the orbit. Vision, $\frac{5}{10}$, not improved. Read type '37 from 17 to 23 cm. imperfectly. Fundus normal. Examination of muscles at 5 m. gave right hyperphoria, 1° ; esophoria, 6° to 11° ; adduction, 23° : abduction, 5° ; supraduction and infraduction, each $1\frac{1}{2}^{\circ}$. At 30 cm. no hyperphoria ; esophoria, 2° . At no time did the patient have diplopia.

Discussion.—Dr. de Schweinitz referred to a case of traumatic enophthalmos he had described five years ago, which seemed best explained by the hypothesis that retraction of the eye may be caused by lesion of the sympathetic. In addition to the clinical cases which have been advanced to support this hypothesis, it is further established by experiments upon animals, as has again been recently shown by Dr. Walter Edmunds, in England. The "sympathetic theory" is not, however, excluded by Dr. Shoemaker's suggestions, only that he makes a somewhat different application of it. If rupture of the Tenon's capsule and the check ligaments is the sole cause of enophthalmos, then it is difficult to explain why the phenomenon does not more frequently appear after operations upon the orbit. It is easy to understand why ordinary tenotomies would not produce the condition, but more extensive operations, such as elaborate advancements, operations for the removal of tumours of the orbit, and cases of abscess in the orbit—examples of which Dr. de Schweinitz recited where he

knew the capsule of Tenon and the check ligaments had been extensively disturbed without producing enophthalmos—ought to have a different effect. Doubtless every case of enophthalmos could not be explained by one theory alone. Dr. Risley regarded Dr. Shoemaker's explanation of the occurrence of enophthalmos, while not conclusive, the most satisfactory with which he was familiar. That enophthalmos does not follow operations upon the eyeball he believed to be due to the fact that the lacerations were not sufficiently extensive to involve the capsule throughout the extent of the circle of the globe. Dr. Shoemaker stated that tenotomies are not followed by enophthalmos, because all the interference is anterior to the supporting fascia and does not disturb it. The extensive surgical interference practised in some suppurating cases without causing enophthalmos, he argued to be in favour of the importance of the orbital fascia, because the fascia remains intact. This is also an argument against the absorption theories. Furthermore, the wounds produced in the fascia in thus operating are punctures with a narrow knife and are quite different in effect from rents or tears. He believed that the fascia being fibro-elastic is one of the most resisting structures and the last to yield to suppuration.

The Filling of Collapsed Eyeballs with Physiological Salt Solutions.—Dr. de Schweinitz, after referring to the observations of Joseph A. Andrews and Herman Knapp, related the history of a case of extraction of cataract in which, at the conclusion of the section, the patient suddenly squeezed the lids together so hard that the lens was forcibly expelled and shot some distance out upon the bed. There was large prolapse of the vitreous and tearing loose of the upper half of the iris, which, curled and anteverted, fell to the bottom of the anterior chamber. The iris was withdrawn from this position, cut off as in the operation of iridectomy, and the collapsed eyeball filled with a warm physiological salt solution producing immediate coaptation of the wound and return of the eyeball to its normal shape. The patient readily counted fingers. There was uninterrupted healing, and seven weeks after the extraction the vision, with + 11 s. \ominus + 3 c., axis 180° , was $\frac{6}{15}$. The eyeground could be well studied, the only changes being some vitreous opacities. Other complications in this case were chronic hypertrophic blepharitis with trichiasis and associated conjunctivitis.

Discussion.—Dr. Zentmayer stated that he had injected physiological salt solution in a case of collapse of the globe following attempts to remove a piece of steel. The eyeball was preserved

for two weeks following this procedure, but enucleation was performed for fear of sympathetic inflammation. Dr. Hansell called attention to the use, in 1865, by Webster, of injections of salt and boric-acid solution into the anterior chamber for the purpose of removing lens matter and other foreign bodies; he himself had recently employed injections of salt solution in a collapsed eyeball following a severe injury of the ciliary region. A large amount of vitreous had escaped, and this had been replaced by two syringe-fuls of normal salt solution. The conjunctival wound was closed by sutures. The ball regained its normal form and outline, but vision was lost. He was uncertain as to the value of injections, since he had seen the vitreous chamber entirely rehabilitated after extensive loss of vitreous fluid following cataract extraction. Dr. Ziegler referred to 3 cases of extensive loss of fluid vitreous. In the first he caught the lost vitreous in a pipette and restored it to the chamber; in the second he injected sterile water; and in the third he inserted a corneo-scleral suture prior to injecting the sterile solution, and thus was enabled to avoid further escape of the contents of the vitreous chamber. Good results were achieved in all, but best in the suture case. Dr. Harlan referred to the recovery of form and shape of the ball through the recuperative power of the eye without recourse to artificial substitutes for the vitreous. His experience included several cases of good recovery without resorting to injections.

Left Hemianopsia with Alexia.—Dr. S. D. Risley reported a case in which there were also partial temporary visual aphasia, amnesia, and amnesic colour-blindness following an attack of influenza. The patient, a large, muscular man of previous good health, was attacked with vertigo in September, 1898, while at the dinner table, being subsequently awakened during the night with hemicrania, unassociated with nausea or vomiting, but accompanied with tense pulse and rise of temperature. The following morning he became unconscious, and remained so for three days, during which time he vomited frequently. For three weeks there were lucid intervals, with prolonged lapses of insensibility. When consciousness was sufficiently restored he noticed confusion of vision, failing to recognise members of his family and friends until they spoke to him, although able to see them with clearness. Examination two months after the beginning of the illness showed absolute left hemianopsia, vision $\frac{2}{30}$, the test letters being called with but little hesitation, but a printed page could not be read except by spelling aloud each word letter by letter, and then reading the phrase or short sentence so spelled out. He could write a letter,

but was unable to read it if a few minutes intervened. He could add a column of figures with but little difficulty. He could match but not name the Holmgren colour skeins, although it was impossible to deceive him by miscalling any of the colours. The ophthalmoscope showed optic neuritis. Under increasing doses of potassium iodide all the symptoms improved, the vision rising to nearly normal, the hemianopsia for form disappearing, although returning under fatigue, but the word-blindness remained, so that he was unable to read a book. In March, 1900, following severe mental anxiety due to illness of an only son, the hemianopsia and alexia became as complete as when first seen. The left hemianopsia associated with the word-blindness was pointed out as peculiar, although, unfortunately, no note was made as to whether the man was left-handed or not.

Discussion.—Dr. Thorington referred to a case of an elderly woman whose left arm and leg became paralysed following an attack of apoplexy. Aphasia was a prominent symptom and illustrated the classification suggested by Hinshelwood, of Glasgow, that aphasia may be divided into three classes, consisting of mind-, letter-, and word-blindness. After some months the patient recovered from the mind- and word-blindness, but remained unable to recognise letters. The ability to name numerals correctly marked the first step in her recovery.

Partial Paralysis of the Third Nerve.—Dr. S. D. Risley related a case of a man, aged 48, who was thrown violently from a buggy, and a large area of the right frontal region was denuded and the scalp turned forward over the face. After two days of total unconsciousness he slowly recovered. Three months after the accident there was nearly complete paralysis of all of the branches of the third nerve except that supplying the levator, which was intact.

WILLIAM M. SWEET,
Clerk of Section.



REMARKS ON COLOUR BLINDNESS AND THE TESTS TO BE ADOPTED FOR ITS DETECTION.

BY F. W. EDRIDGE-GREEN, M.D., F.R.C.S.

IN the *Lancet* of May 26, 1900, I drew attention to the inefficiency of Holmgren's test for colour blindness, and the change which has taken place in medical opinion. So strong was the opinion ten years ago in favour of this test that a leading ophthalmic surgeon, when I stated that I had passed a colour-blind man with Holmgren's test, replied that he was certain that I had made a mistake, and "not having seen he could not believe."¹ It will be noticed that I have said "medical opinion," because I know of at least one physicist who firmly believes in this test. In bringing forward the additional evidence in support of the views which I have already published, I will commence with the Report of the Royal Society's Committee on colour vision. It will be obvious that if I can obtain evidence from this report in favour of my views it will be doubly important, as the Committee gave their verdict in favour of Holmgren's test. How they came to this opinion in face of the evidence before them is incredible to me, but I may say candidly that I do not consider a physicist a proper person to be a referee on this question, as he is always liable to mistake for psychical phenomena results which are only

¹ *Journal of the Society of Arts*, January 24, 1890, p. 204.

physical, chemical, or electrical. When the phenomena are psychical they cannot be measured by the balance and the rule, but must be gained by direct evidence from the mind itself. The physicist is also very liable to fall into the error of comparing facts which are not comparable. Of this I will give instances when dealing with the theories of colour perception.

In reading the Committee's Report, the last page of which gives a summary of the cases of colour blindness detected at the examination of about 300 railway employés, one is struck by two facts: first, that five colour-blind persons escaped detection by the wool test, and secondly, that *no colour-blind person escaped detection by all the lantern tests*. That is to say, that though a colour-blind person was passed by one lantern test, the same man was rejected by another examiner using another lantern test. The obvious conclusion is, therefore, that a lantern test could be constructed that would detect all cases. (In this connection I may mention that in that Report I am incorrectly represented in two respects—first, I rejected No. 191 instead of passing him, and secondly, I detected *nine* colour-blind men. I may mention that No. 191 was the most marked case of colour blindness that I examined; he confused purple and grey with green.) We are, however, now only concerned with the facts before us, and they are quite sufficient for my purpose. The two cases which are recorded as rejected by me each present peculiar characters which made me make the notes recorded at the bottom of the page. It will be noticed that No. 122 was rejected by Holmgren's test but was passed by two examiners using lantern tests. This is precisely the class of colour blind who will escape detection by the ordinary lantern test. When I was appointed by the Board of Trade to advise on the subject of Colour Blindness, one of the first cases that was referred to me was of this kind.

The second case, No. 641, is even more important, as he was passed by Holmgren's test, and he is typical of the class of cases that are passed by this test.

The reader will not be surprised to hear, after reading the above, that the Holmgren test has in practice been found unsatisfactory. (See *Lancet*, May 26, 1900.)

I may say that in addition to the above I have numerous letters from specialists expressing the same views, but to these I cannot refer without asking the permission of the authors.

Before discussing present opinion on the theories of colour perception I will give my own views¹ in the briefest manner, as it will make the points that I wish to discuss more intelligible.

They are, that the perception of colour is conveyed to the mind through a perceptive centre, and that this perceptive centre is only able to distinguish six definite points of difference (colours) in the spectrum which really presents millions. We, therefore, for the normal sighted, have a hexachromic theory of colour vision which is independent of light and shade. A hexachromic theory will obviously explain all that can be explained by a trichromic theory. It also agrees with the fact that both blue and violet have been demonstrated to be primary. The degrees and varieties of colour blindness are perfectly explained by the theory. Assuming that the perceptive centre is smaller, fewer points of difference will be seen. The phenomena of contrast are explained on the view that colour, being a point of difference, this becomes more marked on comparison. If we contrast a yellow with a greenish yellow, the yellow inclines to orange, and the greenish yellow to yellow-green. This could not be explained by assuming that the colours differ

¹ "Colour Blindness and Colour Perception," *International Scientific Series*. Kegan Paul & Co.

by the addition of the complementary to each, as the complementary of yellow is blue, and this mixed with yellow would make white instead of orange-yellow.

The theory I have formed as to the part played by the retina, which is supported by numerous experiments, is that light acting upon the retina liberates the visual purple from the rods and a photograph is formed, the cones conveying the impression of the photograph to the brain. I believe that shortening of the spectrum is due to some defect in this visual substance, as it may be met with in otherwise normal-sighted persons, and there is light as well as colour loss. When a colour-blind person has his spectrum shortened, the junctions of his colours are moved towards the unshortened side. In dichromic cases this has led to the division into red and green blindness. When the red end of the spectrum is shortened, the neutral point is proportionately nearer the violet end of the spectrum. I find that the position of the neutral point entirely depends upon the degree of shortening. When the spectrum is shortened in those who see three colours in the spectrum the junctions of the colours are nearer the unshortened side than in those who have a spectrum of normal length. A very strong fact against the Young-Helmholtz theory is that in so-called green blindness I have never found any loss in the perception of light similar to that found when there is shortening of the spectrum.

From the experiments which I have made during the last ten years, and from the evidence supplied by others, I feel convinced that not only is there a visual substance but that substance is purple. I will not refer to facts concerning the visual purple which are generally known, or to those which I have already mentioned in my book on colour blindness. Kühne, who made so many observations on the visual purple, stated that it could not be essential to vision, and

could not be the visual substance, because it was absent from the cones, and only cones were to be found in the fovea centralis, the region of most distinct vision ; that it is entirely wanting in some animals which see very well ; and lastly, that animals such as frogs, naturally possessing the pigment, continue to see very well when their visual purple has been absolutely bleached, as it may be by prolonged exposure of the eyes to strong light. I will deal with the last two objections first. The second objection may be answered by the view that there may be a similar substance present in the eye of these animals having the same function, but that to our eyes it is colourless. The third objection may be answered by comparing the retina with any secreting gland. Just as the mamma keeps secreting on stimulation, the pigment cells of the retina may be secreting sufficient of the visual purple for vision, but not sufficient for external recognition. We know that when the retina is stimulated by light the processes of the pigment cells are forced down amongst the rods as far as the external limiting membrane. The first objection of Kühne is very important, but may be answered by the hypothesis which I have put forward, namely, that the cones are not sensitive to light but only to changes in the visual purple. I mean that they are not sensitive to light in the sense that they do not, when light falls upon them, convey any light sensation to the brain. They are sensitive to light in one way, namely, that when light falls upon them it causes the inner limbs to contract, but this change has been noted when light falls on the other eye or on the skin. This may be the means by which the visual purple is drawn out, and support is lent to this view by the fact that the following experiments can be best made with only one eye, and when no light is allowed to fall on any part of the body with the exception of

that which falls on the fovea centralis. They show that light may fall on the fovea centralis without producing any sensation.

(1) If we look at two small isolated stars of equal magnitude either may be made to disappear by looking fixedly at it, whilst the other remains conspicuously visible. I find that the phenomenon is most marked on a dark night, and when the star looked at is in a portion of the sky comparatively free from other stars, and when only one eye is used. On a very dark night a considerable number of small stars, occupying the centre of the field of vision, may be made to disappear, whilst stars occupying other areas of the field of vision are plainly visible.

(2) Other lights or objects, when small and with dark surroundings, as, for instance, a piece of white cardboard on black velvet, may be made to disappear in a similar manner.

(3) No change can be observed if a very bright light, a group of stars, or a uniformly illuminated surface, be made the subject of the experiment.

(4) If we look at an illuminated object through a pin hole in a piece of black cardboard surrounded by black velvet, we find that unless it be very bright it will not be visible at all. On moving the eye, so that the image does not fall on the centre of the retina, the object appears brighter.

(5) In this experiment I made quite a bright lantern light disappear. I took the greatest care that no light entered my eye other than that falling on the fovea centralis, and the light faded at once and left the field of vision absolutely dark.

I find that the after image of any spectral colour, and of white light, is purple if we take care not to look at the colour too long. The following is an easy method of proving this. Look at a dull white cloud for a second or two and then close the eyes, covering

them with the hands so that no light can enter the eyes through the eyelids. A dull purple will first be seen, and for a few seconds this gets brighter and brighter, giving the sensation of a bright purple light. This gradually fades away from without inwards without changing colour. Mr. Shelford Bidwell has also made some very interesting experiments bearing on this point. Space will not permit me to do more than allude to other facts supporting this view of the functions of the rods and cones. They are — entoptic phenomena, anatomical distribution, area of greatest luminosity, and the fact that purple is the only colour not found in the spectrum.

In reviewing the theories of colour blindness, I will first draw attention to a most admirable paper by Dr. Pole, who has done so much to advance our knowledge of colour blindness. In this¹ and associated articles he points out the change of opinion which has taken place and the abandonment by Helmholtz of the older explanation of colour blindness. Professor Hamilton, in his exhaustive treatise on Pathology,² says when commenting on my theory: "The two theories of colour vision which for long held the field, and still, to a certain extent, retain it, were respectively those of Young and Helmholtz, and of Hering." He then describes these theories and says, "All these theories, however, pre-suppose that the essential defect is in the retina. From what we now know of the visual centre in the brain, it seems quite as likely, if not more so, that the vice is located in the apperceptive centre—that, in fact, colour blindness is essentially a disease of

¹ "On the Present State of Knowledge and Opinion in Regard to Colour Blindness," by W. Pole, F.R.S., *Transactions of the Royal Society of Edinburgh*, 1893.

² "A Text Book of Pathology," by D. J. Hamilton, M.B., F.R.C.S.E., F.R.S.E. London: Macmillan & Co., vol. ii., p. 699.

interpretation, not one which is bound up with the mechanism placing the visual centre in communication with the periphery; that it is, in fact, simply a form, and probably a very pure one, of congenital psychical blindness."

I will not go through the objections which I have raised to any retinal theory of colour vision, because these objections have never been answered; they have either been accepted or ignored. I may say that I totally disagree with the opinion that normal colour vision is trichromic, and I consider that the curves and equations which have been constructed to prove that normal colour vision is trichromic are mathematically incorrect, judged only by the facts on which they were based. I raised this point in a paper which was read before the Royal Society on June 21 of this year. Equal stimulation of the three sets of fibres is supposed to cause the sensation of white light. Red and green when mixed make yellow. Violet and green when mixed make blue. But yellow and blue when mixed make white, which makes one portion of green too many, thus: $R + G = Y$, and $G + V = B$, but $Y + B = \text{white}$, therefore, $R + G + G + V$ should equal white, but $R + G + V = \text{white}$.

Opinion has steadily grown in favour of the view that a central lesion may be the cause of colour blindness. In 1897 the following was written by Dr. R. Hilbert:¹ "Only a single author considers the existence of a colour-perceiving centre as unnecessary."

In a discussion on some cases of colour blindness before the Heidelberg Ophthalmological Society, 1898,² "Lucanus mentioned a case of total colour blindness which recovered completely and which he considered to have been of central origin. Leber observed that

¹ Richard Hilbert, *Die Pathologie des Farbensinnes*, 1897.

² OPTHALMIC REVIEW, 1899, p. 313.

there is a good deal to be said in favour of the view that the congenital colour blindness, too, is due to a central lesion."

Lastly, the case recently recorded by Dr. Mackay¹ is of great importance as evidence of the exact position of the colour-perceiving centre in the brain.

In another paper² I have discussed the limitation of physical methods in the investigation of the phenomena of sight. If my view be correct as to the existence of a separate colour-perceiving centre, then methods which aim at obtaining information concerning a colour by measuring its luminosity are not more likely to be followed by a useful result than if we were to endeavour to obtain information concerning the pitch of a note by observations on the intensity with which it is struck.

REVIEWS.

WARD A. HOLDEN (New York). *The Sequence of Changes in the Optic Chiasma produced by Acromegaly, as exemplified by Three Cases.* *Archives of Neurology and Psychopathology*, vol. ii., 1899.

THE results of microscopic examination of three optic chiasma distorted by acromegaly, with the changes in the adjoining bony parts, furnish the basis of Holden's paper. He finds that the gross changes which the chiasma may be expected to undergo in this disease are:—

First, the posterior portion of the chiasma is compressed by the pituitary body. Following this, the posterior and middle portions of the chiasma are flattened and forced upward, and thus separated from the anterior portion

¹ OPHTHALMIC REVIEW, 1900, p. 113.

² *Lancet*, August 4, 1900.

which is protected by the bone beneath it. Later, with this tilting upward of the chiasma posteriorly and forcing forward of the anterior wall of the pituitary fossa, the anterior portion of the chiasma is encroached upon by the pituitary body and arched directly forward. Finally, the chiasma may be severed completely.

The chiasma in acromegaly is, generally speaking, compressed between the base of the brain and the soft encapsulated pituitary body, which, however, never penetrates the chiasma as it may do when it is the seat of a malignant growth. The pressure, therefore, is generally diffuse, and the degeneration which is brought about in the chiasma need not always be at the point of contact with the pituitary body. Furthermore, with this diffuse pressure large portions of the chiasma may have their function interfered with, but oftentimes only slightly, so that the resulting defect in the field is not absolute, but for colours or pale greys alone.

In Case I. the bundles directly compressed would seem to have comprised principally those fibres making up the commissures which run from the basal ganglia of one side through the tracts and chiasma to the other side. Destruction of these commissures need not affect vision.

In Case II., besides apparent cutting through of the chiasma in the median line, the optic nerves were compressed directly between the pituitary body and the rigid anterior cerebral arteries. The right nerve was found to be completely atrophic, and the left nerve atrophic in its central and its inner-upper portions.

In Case III., with moderate concentric contraction of the visual fields, it was found that, in spite of the lateral stretching of the chiasma and the compression of its median portion, a certain number of the crossing fibres were still preserved, showing that the optic nerve fibres offer great resistance to stretching and compression, provided that the offending body be soft and slow of growth. In this case the atrophy of the optic nerves just anterior to the chiasma was chiefly in their inner-lower quadrants.

It is evident that there may be considerable differences

as respects the location of the atrophic bundles in the chiasma. If the pituitary body becomes enlarged symmetrically, it may be expected that the chiasma will be compressed posteriorly and flattened out laterally. With a diffuse pressure on the chiasma in its entire lateral extent there will probably be concentric contraction of the visual fields; but if the median portion of the chiasma is the more compressed, as is frequently the case, the crossing fibres in the chiasma will be those most interfered with, and there will result a more or less typical bi-temporal hemianopsia.

If, however, one side of the pituitary body enlarges more rapidly than the other, for a time one tract alone may be compressed, causing homonymous hemianopsia. Again, the atrophy in one optic nerve may differ from that in the other because one nerve has been pressed against a rigid anterior cerebral artery instead of against the soft brain substance. This was seen in Case II.

Broca believed that the optic nerves might be compressed by a narrowing of the optic foramina. In this case the optic foramina were, indeed, diminished in size; but the optic nerves were already slightly atrophied and reduced in diameter, and they were not compressed by the bone.

Finally, in view of the fact that there are frequently signs of inflammation of the optic nerves, amounting at times to choked disc, the nerve fibres may be compressed as a result of interstitial inflammation, or the compression of the papillary arteries may lead to the degeneration of the ganglion cells of the retina and ascending atrophy of the nerve. In none of the three cases here described, however, were any microscopic signs of neuritis discovered.

Nearly 200 cases of acromegaly have been reported, and visual disturbances have been noted in about one-half of them. In over 50 per cent. of the cases with disturbance of vision, there has been concentric contraction of the visual field with diminution of central acuteness of vision; in somewhat less than 50 per cent. there has

been bi-temporal hemianopsia, absolute or for colours only, with or without some contraction of the nasal halves of the fields. In half-a-dozen cases there has been homonymous hemianopsia, absolute or for colours only, and in one case there was found bi-nasal hemianopsia.

The type of contraction of the field may, of course, change as the pituitary body grows larger. Thus, if there is at first a homonymous hemianopsia from pressure on one tract, the chiasma itself will soon become involved, and that eye which had previously lost its nasal field will now lose its temporal field also.

Again, when at first there has been bi-temporal hemianopsia, later the nasal halves of the fields may be lost, either by slow concentric contraction or by the more rapid loss of individual sections.

There is no special time for the appearance of visual symptoms in acromegaly. These come on, occasionally, soon after the enlargement of the extremities is noticed, but usually not until years after, and the disease may exist for ten or fifteen years without the appearance of any visual disturbance whatever.

E. J.

G. BOREL (Neuchatel). Traumatic Ocular Hysteria. Part ii. *Annales d'Oculistique*, April, 1900.¹

MOTOR PHENOMENA.

A.—*Nystagmus* as a hysterical sign has only recently been studied. The presence or absence of nystagmus accompanying blepharospasm was formerly supposed to mark the difference between hysteria and disseminated sclerosis; but this is now admitted to be doubtful. The first recognised case of hysterical nystagmus was one under the care of Professor Hirt, of Breslau. Borel reports a case at length in which, besides other hysterical symptoms, ptosis developed with fine fibrillary tremors in

¹ See OPHTHALMIC REVIEW, 1900, p. 157.

the drooped lid. On an attempt to raise the lid resistance was experienced, showing that spasm of the orbicularis played an even greater part than loss of power of the levator, which, however, was completely paralysed, for when the left eye was opened *ad maximum*, the left ptosis remained unaltered without any increase in the orbicular spasm. Such a combination of paralysis and spasm working to the same end is found only in hysterical subjects. In this case there was also horizontal and rotatory nystagmus, three to four oscillations per second, but very variable in intensity.

B.—Insufficiency of Convergence occurs in exophthalmic goitre, disseminated sclerosis, locomotor ataxia, neurasthenia, alcoholism, and as a separate affection. In one of Borel's cases of hysteria convergence amounted to only three metre angles, but after recovery it reached fourteen. It is especially found in traumatic cases, and in many of these is the explanation of the persistent asthenopia.

C.—Blepharospasm may be either tonic or clonic, it may be very slight or so severe as to simulate entropion. When blepharospasm follows a trauma it is highly suggestive of hysteria.

D.—Strabismus.—A similar condition can be produced in hypnotised hysterical subjects. The spasm of the internal rectus may be so great that the affected eye is immobile. Mobility returns suddenly after a time.

E.—Glosso-labio-facial Hemispasm exists as a hysterical stigma, when it is apt to be confounded with facial paralysis of the other side. In hysterical cases the lips show the characteristic tremor, the tongue is deviated to the contractured side and the lids are often affected; in some cases the extrinsic eye muscles may participate.

F.—Paralysis of the Orbicularis Palpebrarum is very rare, but one case is mentioned.

G.—Astigmatism.—Borel reports a case in which glasses greatly improved the vision; soon, however, amblyopia developed. The case was cured by strong suggestion and excellent emmetropic vision returned. This partial contracture shows to what extent dissociation in the

diathesis of contracture can be pushed. He has also seen persistent anæsthesia in certain sectors of the cornea. Hysterical astigmatism is more frequent in traumatic cases, and it may amount to more than 2 D.; it may coincide with monocular diplopia, but this is not invariable, a fact which proves that the latter phenomenon is not due to abnormal curvature of the lens. It may remain in one fixed meridian, but sometimes it passes from one meridian to another. Persistence for a considerable time, followed by complete disappearance, is the certain sign of its hysterical origin.

H.—Paralysis of Accommodation occurs more frequently without mydriasis than with it. A combination of spasm and paresis is characteristic, and sometimes is the first symptom of the hysteria. A case is recorded in which total paralysis in both eyes followed a small corneal wound of one, and persisted for four years.

I.—Mydriasis persisted after atropinisation in three cases mentioned; the use of atropin in hysteria is unwise on this account.

J.—Spasm of Accommodation is found after slight injuries and simulates a true myopia.

K.—Contractures may occur anywhere; it is important to remember this in recognising hysteria.

VISUAL PHENOMENA.

A.—Erythropsia is not common. It should be considered as hysterical in all cases except in those in which it must be attributed to dazzling, *e.g.*, in aphakia. It may be the only symptom, especially in traumatic cases. In two cases quoted a hemierythropsia superior was met with, the upper halves of the field having red vision, and the lower halves yellowish. Erythropsia, in Borel's opinion, is due to changes in the central nervous system; and in proof of this he cites various cases, including one in which the phenomenon, together with hemiopia and migraine, constituted an epileptic aura; another in which intestinal worms produced the symptom; a third in which indigestion was the cause; and

a fourth in which erythropsia, aphasia, and hemiplegia existed together. Further, it is only reasonable to suppose a central origin for such a condition as monocular bicoloured diplopia. Lastly, one of Borel's patients stated that she saw red in her dreams. (!) Erythropsia can be produced by suggestion in hysterical subjects with real acquired blindness. The retina does not participate in the matter except where dazzling is a predisposing cause.

B.—The old ideas that *Monocular Diplopia* results from wrinkling of the cornea by spastic compression by the lids, or from segmentation of the crystalline lens, are untenable. A detailed account of a case under the care of Professor Sahli, of Berne, is given, in which there were most of the ordinary hysterical signs and, in addition, monocular diplopia of both eyes, very singular in its characters, was noted. The symptom can be easily produced by suggestion.

C.—*Micropsia* is, in Borel's opinion, undoubtedly psychical. In monocular diplopia the red image is not unusually smaller than the white. It occurs independently of paresis or spasm of the ciliary muscle.

D.—Marked *Photophobia* after slight trauma should suggest hysteria.

SENSORY PHENOMENA

include supra-orbital neuralgia, loss of muscle sense in the ocular muscles, and anæsthesia of the cornea and lids.

PSYCHIC PHENOMENA.

A.—*Sexual*: The moral being has sometimes been entirely changed in hysterical patients, both female and male. In men, loss of sexual power is not unknown.

B.—*Character* is always changed for the worse. The handwriting becomes altered.

Prognosis.—If the prognosis of traumatic hysteria is good as to the final result, it is grave as far as duration is concerned, for it may persist for months and even years, especially in males. The question is asked whether the vaso-motor complications ever leave permanent traces.

Hysteria is psychical, and anatomy and physiology offer no explanation of its phenomena. Functions are interfered with, but the organs are left intact.

Treatment.—Hysteria being psychical, treatment must be so also. The least interference of a surgical nature cannot be borne, and even physiological events, such as parturition, produce a bad effect; a bandage over an eye brings on amaurosis, a bandage round a limb contracture or anæsthesia.

Borel is a very energetic and vehement opponent of those who have recommended and practised removal of portions of the genital organs, and other equally dangerous and useless operations, for the cure of hysteria; and is especially bitter against some who have removed pieces of the orbicularis in cases of blepharospasm.

J. GRAY CLEGG.



F. LAGRANGE (Bordeaux). Lipoma and Dermo-lipoma of the Subconjunctival Tissue. *Archives d'Ophthalmologie*, June, 1900.

The affection known as subconjunctival lipoma is, more often than not, a congenital dermo-lipoma, resulting from the inclusion beneath the conjunctiva of retro-dermic elements. Occasionally, however, a genuine lipoma develops in the subconjunctival tissue. Lagrange in this paper publishes three cases in which he removed and examined the growth. In two the histological characters of the tumour proved it to belong to the dermo-lipomata; in the third case the sections showed the structure of a simple lipoma. Drawings of the clinical appearances and the microscopic characters of the growths are given in the Archives.

The female sex appears to be more prone to these tumours than the male sex. The growths are always congenital, although frequently not discovered for years. They are generally dermo-lipomata, but as already men-

tioned, are rarely pure lipomata, arising in the subconjunctival tissue, and not, as Graefe supposed, in the deep orbital fat.

The common site of these tumours is the temporal part of the upper cul-de-sac of the conjunctiva; Panas has seen a case in which the growth was at the inner end of the lower fornix. Varying in size from that of a pea to that of a large almond, the growth is generally unilateral. The surface is yellowish, occasionally pink, and not infrequently shows thickened white glistening plaques on it. The plaques are vestiges of the epidermis and betray the origin of the tumour. More positive evidence on this point is the occasional discovery in the growths of epidermic structures, such as hairs and rudimentary glands. It is very rare to find hairs on the surface of these tumours, wherein they differ notably from the corneal dermoid growths. These subconjunctival dermo-lipomata are freely movable on the structures beneath them, but except in the purely fatty growths the overlying conjunctiva is not quite free. Lagrange thinks this is a useful diagnostic difference between the two kinds of tumour.

The removal of these tumours, when they are sufficiently large to be a noticeable deformity, is unattended by difficulty.

A bibliography of the subject is given by the author.

J. B. L.

BEST (Giessen). The Degenerative Changes in Eyes Presenting the Transverse Corneal Film.
Beiträge zur Augenheilkunde, xliii., 1900.

In this paper Best describes the changes found in nine eyes which presented the form of degeneration known as the transverse calcareous film of the cornea. As regards the anatomy of the film the author does not add materially to the descriptions of Nettleship, Bock, Usher, and others. He finds that the changes affect (1) The epithelium; (2) Bowman's membrane; (3) the anterior lamellæ of the cornea. The epithelium is generally thickened and presents

a very irregular limiting line internally; in a minority of cases it is absent altogether over the affected area, and then its place is taken by an exudate, solidified into irregular droplets having a coral-like aspect on section. Bowman's membrane is broken up and enveloped by a layer of new-formed, non-vascular fibrous tissue. In its remains, in the new-formed tissue, and in the anterior layers of the substance of the cornea, there is a characteristic deposit of finely granular material which may in places be so abundant as to aggregate itself into homogeneous-looking bands, clumps, or nodules. Best has carefully studied the micro-chemical reactions of this material, and his results lead him to conclude that it is an albuminous precipitate from the nutrient fluids of the cornea. In its earliest condition it gives Weigert's fibrin reaction with aniline dyes. This fibrinous material very readily becomes the seat of calcareous deposit, so that it begins to stain with hæmatoxylin, and gives, if in sufficient bulk, an effervescence with acids; but in reference to this it must be remembered that the granular material, though containing carbonate of lime, is still in greatest part albuminous. The calcareous change is the most characteristic, but not the only one which occurs in the new deposit. Portions of it, and more especially the yellowish homogeneous lumps or concretions, are found to stain very readily with Millon's reagent, so that it is to be inferred that they contain the tyrosin molecule in an easily separable state. Best compared the staining reactions of these concretions with those of amyloid substance, colloid from the thyroid gland, and prostatic concretions, and found that they did not agree completely in any one case, the tyrosin reaction in particular not being given with anything like the same readiness by the three latter substances.

The author concludes that in an eye whose nutrition is interfered with by shrinking of the globe, increased tension, or other cause, the added irritation due to the exposure of the portion of the cornea between the lids may give rise to a reaction which differs somewhat in its character from an ordinary inflammation. Judging from one of his specimens

in which the film had not yet reached the centre of the cornea, he thinks that the first recognisable change is a development of new connective-tissue cells in a thin layer beneath Bowman's membrane; the latter becomes œdematous, and exudation occurs between it and the epithelium covering it, and in this exudation connective tissue gradually develops, Bowman's membrane being at the same time broken up and displaced. The excess of nutritional fluid beyond what can be used by the half-vitalised tissues is deposited as the granular material, whose further changes have been described.

The other pathological conditions existing in the eyes which form the subject of the paper are of too varied a character to admit of being usefully summarised.

W. G. L.

ELLINGER. Myxo-Sarcoma of the Optic Nerve; Removal by Krönlein's Operation with Retention of the Eyeball. *Zeitschrift f. Augenheilk.*, Bd. i., p. 48.

AXENFELD & BUSCH. A Case of Primary Myxo-Sarcoma of the Optic Nerve; removal by Krönlein's Operation. *Arch. f. Augenheilk.*, Bd. xxxix., Heft. i.

ARNOLD H. KNAPP. A Case of Orbital Cavernoma; removed by Krönlein's Method, with Preservation of the Eyeball. *Archives of Ophthalm.*, vol. xxix., No. 2.

GOLOWIN. A Case of Tumour of the Optic Nerve; removed by Krönlein's Method. *Abstract in Die Ophthal. Klinik*, January 20, 1900.

Ellinger's patient, a female, aged 10, was first seen in January, 1898. Her left eye had been operated on for squint in May, 1897, but some proptosis had been noticed previously.

The eyeball was proptosed, and displaced downwards

and outwards; movements free, except upwards. A hard body could be felt between the globe and the upper orbital margin. The cornea was sensitive; vision reduced to counting fingers; optic disc atrophic.

After prolonged treatment by iodide of potassium, operation by Krönlein's method was performed on August 13. A curved incision on the left side was made, beginning at the anterior end of the temporal crest and extending downwards and forwards along the outer margin of the orbit to the upper border of the zygomatic arch. The periosteum along the orbital margin was divided and separated from the outer bony wall. A wedge-shaped portion of the outer orbital wall was freed by a chisel, and with the soft tissues attached, was turned outwards and backwards, exposing freely the orbital contents, covered by periosteum. Division of the periosteum antero-posteriorly revealed an elastic firm tumour beginning about 3 mm. from the posterior surface of the eyeball and extending backwards to the optic foramen. The optic nerve was cut through in front of and behind the growth, which was then easily removed. The eyeball sank back in to the orbit, the bony flap was replaced and the skin and deeper tissues sutured. While this was being done the eyeball was suddenly protruded by hæmorrhage. The lids were then united by a suture, and a compress applied.

The patient made a good recovery. By August 30 the wound was quite healed, the cornea had regained sensitiveness, the tension of the eye was normal, but its movements were much restricted.

Two months later the condition was as follows: L., slight enophthalmos; movement of globe good in all directions, but outward rotation is not quite full. Cornea bright, pupil half wide and motionless; T.n., optic disc appears as a dark bluish spot, the retinal vessels show as white streaks; in the macular region are the remains of hæmorrhages. In the peripheral parts of the retina are numerous large pigmented patches.

Axenfeld's patient was a girl, aged 11, with a history of proptosis of the right eye for about six months. She

came under observation early in January, 1898, and was operated upon on March 5, according to the method above described.

On separating the fat and muscles, a smooth tumour of the optic nerve as large as a walnut was found. A silk ligature was passed round the optic nerve between the growth and the eyeball, and the nerve divided close to the globe. The tumour was pulled forward by the silk and the nerve again cut close to the optic foramen. During this procedure the eyeball was forcibly drawn forwards and to the nasal side.

Free bleeding occurred. The bone was replaced and the skin and deeper tissues sutured. An iodoform dressing was applied.

On March 20 the wound was healed and the dressings were omitted; a month later the child left the hospital, when the conditions were as follows:—

R., complete ptosis; movements of eyeball upwards, downwards and inwards, almost completely lost; there is perhaps a little outward movement. No exophthalmos. Fundus oculi very pale, almost white; some hæmorrhage in retina near O.D.; retinal arteries scarcely visible, veins better filled.

On January 15, 1899, considerable change had occurred, the ptosis had almost wholly disappeared. Ocular movements were good in all directions except inwards. The eyeball was not shrunken; the media were clear, pupil smaller than its fellow, and showing slight consensual action; the ophthalmoscope revealed extensive choroido-retinal atrophy, with much pigment accumulation. The cornea was anæsthetic except in its lower outer quadrant.

Knapp's patient, a female, aged 34, had suffered for six or seven years from increasing proptosis of the right eye. The diagnosis was an orbital tumour within the muscular cone, not directly involving the optic nerve. Operation for removal of the growth by Krönlein's procedure, was advised and was performed on August 1, 1899.

A firm rounded tumour was exposed behind the eyeball, freed from its attachments, and shelled out. Palpation of

the optic nerve revealed nothing abnormal. Hæmorrhage was not profuse. The eyeball was pushed back into position, the osteo-plastic flap replaced and the wound closed by deep and superficial sutures. Healing by first intention occurred and the patient was discharged on the tenth day.

On August 17 it was noted that there was no visible deformity except the cicatrix of the skin incision. Vision was $\frac{20}{200}$. The eye was in its normal position, the pupil moderately dilated, sensation unaltered.

On February 19, 1900, paresis of the external rectus was noted, vision was $\frac{20}{50}$, pupil normal.

The tumour was a cavernous angioma.

Golowin's case was that of a male, aged 4, who came under observation with right sided exophthalmos of about ten months' duration, with restriction of movement downwards and outwards. The eye was nearly blind. A tumour could be felt between the globe and the lower orbital border.

The method of operation was similar in this case also, but in addition a horizontal incision was carried along the lower border of the orbit. Healing by first intention occurred. The latest result given was as follows:—Ptosis, enophthalmos, deviation of eye inwards, with loss of movement in all directions, anæsthesia of cornea. The tumour was a myxo-sarcoma, growing from the optic nerve.

The method of dealing with orbital tumours by resection of the outer wall of the orbit, described by Krönlein in 1887,¹ has been much recommended by Braunschweig, who in 1893, and again in 1897, published records of cases. Schlodtmann² has lately collected twenty-six cases operated upon by this method, and some more recent instances have been recorded.

Removal of an orbital tumour with preservation of the eyeball by the older method of operating (cutting down upon the external rectus, dividing it and displacing the globe forcibly towards the nose) has been successfully

¹ *Beiträge zur Klin. Chir.*, Tübingen, 1887, vol. iv.

² *Festschr. f. A. v. Hippel*, Halle, 1900.

carried out in not a few instances. The difficulties are, however, great, and frequently the attempt to save the eye has had to be abandoned. Krönlein's method appears to have many advantages over the older procedure. Resection of the temporal wall of the orbit is not difficult, and the replacement of the bony flap and its retention in position are easily effected. As Knapp remarks, whatever difficulties may arise from the size of the tumour or from hæmorrhage, would be accentuated in the older method of operating.

In cases in which it becomes necessary to remove the whole of the orbital contents, the temporary absence of the outer wall is rather an advantage than a drawback.

The subsequent deformity in the cases reported appears to have been slight. Impaired movement of the globe has been the chief disadvantage. Schlodtmann found that of the twenty-six cases he analysed, in twenty-four there was more or less complete loss of abduction; in one adduction was restricted, and in one normal motility was retained.

The cases hitherto reported naturally fall into two groups; in the first and largest group the tumour is independent of the optic nerve (as in Knapp's case); in the second group the growth springs from the optic nerve. In Schlodtmann's table, referred to above, and comprising twenty-six cases, five were examples of tumour of the optic nerve.

J. B. L.

FRENCH SOCIETY OF OPHTHALMOLOGY.

Annales d'Oculistique, July, 1900.

MEETING ON JUNE 5, 1900.

Sympathetic Ophthalmia following Traumatic Dislocation of the Lens.—M. Wuillomenet related the case of a man who in February, 1898, received a blow from a fist on the left eye. Four months later, when seen for the first time, there was dislocation of the lens upwards, with a dilated pupil and normal tension. Six months later he returned with severe pains, dilatation of the ciliary

veins, and floating vitreous opacities ; at this time the right eye was not complained of. Under cocaine, pilocarpin, and mercurial inunction, his symptoms vanished ; but after another six months he again returned. On this occasion the right eye showed circumcorneal injection, there was photophobia, a contracted, irregular pupil and turbidity of the aqueous humour. The speaker entertained no doubt of the sympathetic nature of the lesion, which recovered under treatment.

M. Darier considered that in such a case the reaction in the sympathising eye could be spoken of only as "irritation," and could not be regarded as so severe as if the original eye had been wounded.

M. Vignes was of opinion that even in such a case enucleation was decidedly called for.

MEETING ON JULY 3, 1900.

Congenital Tumours.—M. Dreyer-Dufer showed two patients—one in whom there was a dermoid cyst adherent to the orbital margin, the other having a subconjunctival lipoma.

Tolerance of the Eye for a Foreign Body.—M. Valude related the case of a man aged 80, who six years previously had been injured by a small piece of stone, but there had apparently been little reaction, even at the time ; and now, though the foreign body is visible in the eye, he has suffered only for a month from an iritis with much lachrymation and photophobia. As these symptoms failed to disappear under treatment, the foreign body, which lay at the foot of the anterior chamber, was removed ; it was about the size of a pin's head. Immediately after this had been accomplished the reaction ceased and vision returned to what it had been. Thus for six years this foreign body had remained in the anterior chamber [?—Ed.] without giving rise to trouble, and the iritis which occurred, and which at last drove the patient to seek advice, is to be regarded as due to an auto-infection, the evil effects of which the presence of this foreign body had attracted to the eye.

M. Terson pointed out that, as Leber has shown, it is largely the chemical and oxidisable nature of a foreign substance rather than microbic infection along with its entrance, which, in most cases, determines the occurrence of subsequent inflammation.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.
SECTION ON OPHTHALMOLOGY.

Dr. G. E. DE SCHWEINITZ, presiding.

MEETING ON APRIL 17, 1900.

Dr. H. F. Hansell exhibited a piece of solder, $1\frac{1}{2}$ by 1 cm., that had been removed from the upper conjunctival sac of a plumber's assistant. The metal had entered the space between the upper lid and ball with considerable force while soft, where it had been moulded to conform exactly to the size and shape of the cul-de-sac. The cornea and conjunctiva were burned, but recovered completely under treatment by cold, followed by hot, compresses, frequent instillations of atropinised fluid vaseline, and separation of the opposing raw conjunctival surfaces by a probe and by manipulation.

Discussion.—Dr. de Schweinitz related a similar case. Dr. Oliver agreed with Lawson that the immediate conversion of conjunctival moisture into steam retarded the burning, and thus tended to save the organ from destruction. In addition, he stated that the characteristics of solder burns, namely, the immediate expansive power of the generated steam, the relatively low temperature of the metal, the rapid cooling, and the smooth and rounded surface of the cooled masses, are absent in injuries with denser and harder metals.

Sympathetic Inflammation occurring more than two months after Enucleation.—Dr. W. Zentmayer read the notes of a case. The foreign body, a piece of steel measuring 14 by 3 mm., was extracted from the vitreous chamber by means of a Hirschberg magnet, but the eye was enucleated three weeks later on account of irido-cyclitis. The fellow eye, at this time, appeared normal in every respect, but nine weeks later became the seat of a sero-plastic irido-cyclitis with marked neuro-retinitis, which at the present time, four months after its onset, has nearly subsided, leaving the eye but little damaged. An optic neuritis was present in the enucleated eye.

Glaucoma in Myopia.—Dr. John T. Carpenter read a paper with report of two cases. In one, a woman, aged 57, there were shallow anterior chamber, pigment spots on the lens capsule, and adhesive inflammation at the lower inner quadrant of the filtration angle. $T. + 2. V. = \frac{6}{12}$, after correction of myopic astigmatism. Eserine checked disease for over a year, but patient

disappeared and later returned totally blind. The myopic astigmatism was regarded as only a coincidence of the glaucomatous process. The second case was a man, aged 39, with no marked choroidal changes, contraction of nasal field and an annual scotoma, deep anterior chamber, little if any rise in tension, but deep glaucomatous excavation, and at one period spontaneous hæmorrhage into the cup. $V. = \frac{9}{16}$, with -6.50 S. As the peripheral field was gradually failing, iridectomy was performed with good results. The development of the glaucoma was believed to be due to the same cause which produced the myopia—the tension causing elongation of the eyeball and progressive myopia; while the unusually small cornea indicated that the eye had originally been hypermetropic. With the advent of sclerotic changes, and a halt in the yielding of the ocular tunics, there occurred glaucomatous pressure upon the nerve head, and the formation of excavation.

Complete Restoration of the Conjunctival Sac by a Single Skin Graft.—Dr. Charles A. Oliver exhibited a case. The narrow band of scar tissue was split throughout its length, and the graft, three times the size of the cicatrix, was stitched into place directly over the exposed orbital contents. Dry heat was kept constantly applied to the parts. In forty-eight hours the graft became vascularised in the region of the stitches, so that when they were removed a few days later the stitch wounds bled. A week later the epidermal plates peeled off, leaving a healthy dermal graft that has remained intact.

Clinical and Pathological Report of three Cases of Secondary Glaucoma.—Drs. W. C. Posey and E. A. Shumway. These represented different types of the disease. In the first case, the glaucoma followed repeated attacks of iritis; in the second, iridocyclitis, consequent upon detached retina in a myopic eye; and in the third, perforation from a corneal ulcer.

The microscopical examination in the first case showed nearly complete atrophy of the nerve, and the complete disappearance of the nerve-fibres and investing tissue in one portion of the nerve, resulting in the formation of a cavity, just posterior to the excavation, which extended from the exterior sheath of the nerve almost to the central vessels. Under high magnification, fine fibres which had the appearance of typical neuroglia fibres were seen to cross the cavity. The few cells present were of this type also, but much larger than normal, showing numerous branching processes, proceeding from a central area of protoplasm, which included the deeply-stained nucleus. The nerve-fibres themselves were seen to

have not only become atrophic, but to have absolutely disappeared, whereas in other parts of the nerve they could still be traced between the fibrous septa.

It was believed that in the area involved there was rarefaction of tissue, that the atrophic process was not accompanied by the usual sclerosis of the connective tissue fibres, and that, perhaps, to some extent the separation of the fibres was increased by the process of hardening and embedding the eye. There were no traces of previously existing exudate or hæmorrhage.

In the second case there was detachment and secondary fibroid degeneration of the retina : plastic iritis, with posterior and anterior synechiæ ; occlusion of the pupil ; anterior capsular and posterior cortical cataracts ; and blocking of the angle of the anterior chamber.

The third case showed the formation, in an exudate on the surface of the choroid, of cavities, the largest being 2 to 3 mm. long and 1 mm. wide, resembling enlarged lymph spaces, and lined with a single layer of pigment cells. The pigment granules were in the form of the minute rods which are typical of the retinal pigment cells. These cavities were explained by a proliferation of the pigment cells, at first in a single layer, later in double layers. With shrinking of the exudate, the layers were pulled apart, fluid collected in the interstices, and the laminæ becoming more and more distended formed the cavities described. In their complete form it is possible that they might act as true lymph spaces, although lined with epithelium instead of endothelium.

Dr. Shumway called attention to a new mounting for sections of eyeballs, in which the strong convex portion is made separate from the cell holding the specimen. By this means one convex glass may be used for a number of mountings, while the removal of the glass permits the specimen to be studied in detail without distortion of the tissues.

Sarcoma of the Choroid.—Dr. Charles A. Oliver described a case of melanotic sarcoma presenting symptoms of secondary glaucoma. When first seen, a freely movable detachment of the retina in a painless eyeball with diminished intra-ocular tension, and reduced vision dating from a traumatism, suggested an ordinary traumatic type of retinal detachment. Sudden increase of tension of the eyeball six months later, with all the signs of secondary hæmorrhagic glaucoma, and the presence of a tumour-mass situated beneath the still fluctuating retinal area, showed the true character of the disease and necessitated immediate enucleation.

Arising from the middle and the external layers of the choroid, and densely pigmented in character, the growth was found to be a round-celled and spindle-celled sarcoma. The chorio-capillaris and the lamina vitrea could be traced over a considerable extent of the mass, and the pigment was found in greatest abundance near the sclerotic. The vascularity of the growth was most pronounced near the optic nerve entrance. The whorls or "mantles" of deeply pigmented tumour-cells around the greatly attenuated vessel-walls were characteristic of sarcoma, although the amount of intercellular substance seemed to be more abundant than is usually found in such cases. The fibroid degeneration of the retina, the secondary atrophy of the optic nerve, and the extensions of the tumour-cells along the vessels of the sclera were of prognostic interest. There was no recurrence or evidence of metastasis.

Monocular Hysterical Amaurosis.—Dr. C. A. Veasey reported a case occurring in a girl, aged 11.

A Cured Retinal Detachment; with Remarks on Retinitis Striata.—Dr. de Schweinitz related the history of a case of retinal detachment occurring spontaneously in a myopic eye, which, under the influence of rest in bed, pilocarpine diaphoresis, and sodium iodide, became re-attached at the end of three days, with complete restoration of the function of the eye. After the re-attachment of the retina there was evident ophthalmoscopically a bifurcated pigmented line with a whitish stripe in its centre, which resembled the so-called retinitis, or chorio-retinitis striata. The ophthalmoscopic appearances were regarded as an interesting confirmation of the views of Caspar that the affection, retinitis striata, represents the remains of cured detachments of the retina, and is at least not always of hæmorrhagic origin.

WILLIAM M. SWEET,
Clerk of Section.

CLINICAL NOTES.

THE PROGNOSTIC SIGNIFICANCE OF INTRAOCULAR HÆMORRHAGE.—The importance of retinal hæmorrhage as an indication of a diseased condition of the walls of the blood-vessels has been emphasised by many writers. C. S. Bull discusses the value of hæmorrhage within the eye in reference to the prognosis, not of vision, but of life. Evidence of the serious import of extravasation from the retinal vessels has been given, notably by Marcus Gunn. Bull summarises his conclusions in the following sentences:—(1) Hæmorrhages into and beneath the conjunctiva are of little importance in the young, as they usually occur as a result of violent muscular effort, as in coughing or long-continued sneezing. In the aged they occur spontaneously and point to a general weakened condition of the vascular walls. (2) Hæmorrhages in the interior of the eye are always of prognostic significance. In senile angiosclerosis retinal hæmorrhages are very frequent, and point significantly to the probable occurrence of cerebral apoplexy. (3) Recurrent retinal and subhyaloid hæmorrhages in the young are of slight prognostic importance, especially if due to syphilis, whether inherited or acquired. (4) Hæmorrhages into the vitreous in the young are of grave prognostic importance and point to the existence of general vascular degeneration. (5) In chronic interstitial nephritis and in diabetes retinal hæmorrhages are of very grave prognostic significance, and independently of the presence of exudative retinitis point to a fatal termination of the disease. The mere presence of thrombosis of the central retinal vein with hæmorrhages in the retina should arouse suspicion of the existence of albuminuria, and if this suspicion is confirmed by urinary analysis the prognosis in the case is more unfavourable than in those cases in which the hæmorrhages do not exist.—*New York Medical Record*, February 3, 1900.

THE RESULTS OF THE PANAS OPERATION FOR STRABISMUS.—Roosa has published particulars of 36 cases of strabismus treated operatively by Panas' method. Of the total number the author operated in 21 cases, Martin in 14, and A. E. Davis in 1 case. Roosa states that a "perfect result, so-called parallelism of the eyes," was obtained in 32 of the 36 cases. In two instances the squint was divergent, in one downward, and in all the others convergent. He adds that "although 35 cases of strabismus cannot be said to be a large number for adequate judgment on many points connected with the subject, they are sufficient to indicate the correctness of the theory of the Panas operation, and to dissipate the fear of over effect from the simultaneous operation on both externi or interni, according to the nature of the strabismus." One sentence in the author's paper is well worth repeating: "He who undertakes the care of a case of strabismus has before him a task involving observations extending over several months and probably years before the affection can be said to be cured."—D. B. St. John Roosa, *The Post Graduate*, March, 1900.

SPASMUS NUTANS OF INFANTS.—Of this curious and little known disease, John Thomson (Edinburgh), publishes a number of fresh cases in the *Festschrift* in honour of Dr. Jacobi; he shows that the large majority of all the cases occur between the fourth and twelfth month, and that girls are somewhat more frequently attacked than boys. It is a curious fact that nearly all the cases occur during December and January, the darkest months of the year, which in Thomson's opinion brings them into an interesting relation with miners' nystagmus, in the development of which defective light has probably considerable influence. It is probable that there are more cases in town than in the country, also because of the light difficulty. In Italy and France the disease appears to be unknown, and in Spain it is very rare; but even in different parts of Germany and of this country its frequency seems to vary greatly. He regards rickets as an important factor in its production.

A CASE OF MICROPHTHALMOS WITH CYSTIC DEVELOPMENT.

BY LESLIE BUCHANAN, M.B.GLASG.

ASSISTANT SURGEON AND PATHOLOGIST, GLASGOW INFIRMARY.

IN May, 1899, an infant of 3 months was brought to the Eye Infirmary (Glasgow), on account of an affection of the right eye which was said to have been present at birth.

On examination it was found that the upper eyelid was distended by the growth in the orbit of a large tumour of smooth contour and reddish colour, and which was covered by somewhat thickened conjunctiva. The lower lid was pushed slightly downwards, and, when further depressed, allowed the oval shape of the protruding growth to be seen. The whole mass measured 36 mm. in transverse and 30 mm. in vertical diameter and was of soft, even fluctuating, consistence. When the lower lid was considerably depressed it was seen that there was a very small cornea situated at the lower and outer part of the front of the tumour.

These various considerations rendered it probable at once that the case was one of microphthalmos with cystic development. The facts that the eyeball was undeveloped, that it was, as it were, part of the growth, and that the bones of the orbit were intact, rendered it probable that the case was not one of meningocele or encephalocele.

As the mass constituted a considerable deformity it was removed, when it was found that the connections

with the orbit were moderately close, and that its posterior part became constricted and ended in a pedicle which passed through the normal fissure into the skull. There was nothing found to indicate that the growth was other than a cystic development from a mal-developed eye.

Macroscopic appearances.—The mass removed may be described as consisting of three distinct parts, the eye, the cyst and the pedicle.

The Eye.—This occupies an antero-externo-inferior position and is delimited by a rather shallow sulcus. It measures 12 mm. across its equator and in median section presents the appearances of the anterior segment only. The cornea, iris, ciliary body, anterior part of the sclerotic and choroid, lens, and a part of what appears to be crumpled retina, can be recognised. The cornea measures 5 mm. across, is clear and rather thicker than the normal. The corneo-scleral margin is normal in appearance. The iris presents no unusual appearance except that the pupillary opening is absent. The ciliary body, which is normal in structure, is attached at the corneo-scleral margin but is drawn centrally from the sclera behind this. The lens is not lying within the cavity of the eye, but almost quite free, in the cyst to the inner side, and is of the normal size and appearance.

The Cyst.—This is composed of moderately dense tissue, and is thicker in some places than in others, varying from 1 to 1.5 mm. It appears to be connected with the stump of the sclerotic, leaving it, however, at an angle more or less acute, and growing forwards and eccentrically. The outer surface of the cyst is smooth and fibrous, the inner rugose and having at many points small rounded bodies, like boiled sago-grains, attached to it. Posteriorly the cyst wall becomes thickened and passes into the solid mass at the back, which tapers into the pedicle.

The Pedicle.—This portion of the mass is solid, and when hardened in formalin is of the consistence of a fibroma. It is of uniform colour and contains one or two minute cystic formations. From it there passes forwards into the interior of the cyst a convoluted mass which has somewhat the appearance of much thickened retina, and is of similar consistence. Apart from the uveal tract there is no development of pigment.

Microscopic appearances.—The parts of the eye which are developed are, in most respects, normal except, as before mentioned, that the pupillary opening is absent. It is seen that there is a deviation of some of the fibres of the sclerotic into the cyst wall, and that the portion of the choroid which is perfectly developed seems to take part with the sclera in the formation of the cyst wall. The cyst wall itself is composed of tissue similar in nature to that of the solid portion of the growth behind, which may be termed elemental nervous tissue. Two layers enter into the composition of the wall, the one external connected with the sclera, the other internal, with the choroid, *i.e.*, there is an abrupt change in the appearance of the tissues at the points of deviation from the normal curve of the coats of the eye, but the tissues are co-terminous. The parts of the solid portions of the mass which project into the cyst are of similar structure to that of the cyst wall and the solid mass behind. The structure described above as elemental nervous is finely fibrous with large oval nucleated cells lying in fairly well defined spaces. This structure, with bands of firmer fibrous tissue, thus composes the tumour mass, the whole being fairly vascular.

It may be mentioned that in a few places there is an accumulation of cells which seem to show a tendency to arrangement in layers, which seem to suggest retinal

structure. These little patches of retina-like tissue are found mostly in the intra-cystic formations. There is no evidence of the existence of any canal at any portion of the pedicle, nor is there any definite sheath, although the structure is more definitely fibrous near the surface, the interior being more nervous in appearance.

In conclusion, it is worthy of note that the stump of the sclerotic is very much shorter at the inner than at the outer side, and that from the inner side the cystic development seems to have taken place. The whole of the true cystic formation is to the inner side, and intervenes between the stump of the sclera and the greatly thickened pedicle, whilst to the outer side the stump of sclerotic passes almost unchanged into the solid portion of the mass. This matter is of importance in so far as it may be possible to account for the state of matters in such a case in either of two ways.

The first and most simple solution of the matter is as follows :—

Assuming the correctness of the explanation of such cystic development with subsequent microphthalmos, it may be supposed that here a very large mass of retina has escaped at a very early stage. Following this escape the development of the retina outside the eye has gone on to a greater extent than normal, and has caused either mal-development of the posterior segment of the developing eye, or has destroyed that portion of it already developed. The anterior segment of the eye, being nourished in the early stages from the surrounding mesoblastic tissue, does not suffer. The optic nerve is never developed as such, but becomes diffuse, as it were, and mingles with the surrounding mesoblastic tissue in the orbit.

The second explanation which might be given is that, subsequent to the development of a cystic forma-



FIG. 1.



FIG. 2.

tion, a tumour of the optic nerve has developed, a neuroma which the tissue of the solid portion strongly resembles; and that by intrusion of this new growth into the cyst cavity this latter has become enlarged.

In this way the intracystic formation could readily be explained, whereas in the other case no clear explanation can be given.

The photos show (fig. 1) the appearances of the child, the lower lid being drawn to show the cornea, as well as is possible, just above the thumb at the outer canthus; and (fig. 2) the appearance of the half of the excised mass (exact size).

ACUTE GLAUCOMA AFTER THE USE OF COCAINE, WITH REMARKS ON THE USE OF HOLOCAINE IN GLAUCOMA.

BY JAMES HINSHELWOOD, M.A., M.D.

SURGEON TO THE GLASGOW EYE INFIRMARY.

AT the meeting of the Ophthalmological Society at Heidelberg, in 1897, Groenouw, of Breslau, advocated the use of cocaine in glaucoma. He maintained that whilst most of the text-books warn the surgeon against the employment of any mydriatic, cocaine included, in acute glaucoma, this prohibition was based more upon theoretical consideration than actual observation, and he recorded in his paper some cases of glaucoma benefited by the instillation of cocaine. In consequence of his observations Groenouw advocated the use of cocaine in glaucoma, not as a substitute for iridectomy, but as a useful symptomatic remedy, which combined the mydriatic action of atropine with the tension-reducing action of eserine. In the discussion which followed the reading of this paper, these views received a certain amount of support.

Opinions being divided on a subject of such importance, the following case is recorded as a contribution towards the settlement of the question as to the reality of the dangers consequent on the use of cocaine in glaucoma.

A lady, aged 50, consulted me at the beginning of 1898 regarding her eyes. She complained particularly of attacks of headache, coming on after using her eyes for any length of time. These attacks of headache in the evening were sometimes accompanied by dimness of vision, which, however, along with the headache entirely disappeared after a night's rest. As the patient had six dioptries of hypermetropia and was wearing glasses too weak for her, I was inclined to regard the headaches and occasional obscuration of vision coming on in the evening as simply due to asthenopia from excessive eye strain. The patient was of a highly neurotic temperament. The tension of each globe was normal and the pupils were contracted. In fact so contracted were the pupils that I could not get a good view of the fundus. I therefore determined to dilate them slightly with a few drops of a 2 per cent. solution of cocaine. I purposely refrained from the employment of homatropine, fearing to dilate the pupils fully in the case of a woman of neurotic temperament with a high degree of hypermetropia and suffering from occasional attacks of headache. I thought that the slight dilatation obtainable from a few drops of 2 per cent. solution would be quite safe and enable me to get a satisfactory view of the fundus. There was nothing special observable on the disc or the rest of the fundus, and the patient withdrew after receiving a prescription for suitable glasses.

Early on the following morning I was requested to visit the patient at her own home. I was informed that very shortly after returning home on the previous evening from visiting me she began to complain of pain in her right eye. The pain gradually became more intense, was accompanied by vomiting, and was so bad during the night as entirely

to prevent her from sleeping. When I saw her she was suffering greatly from violent pain in the right eye and on the right side of the head. There was considerable pericorneal injection with lachrimation, the pupil was moderately dilated and immobile, the cornea somewhat steamy, the anterior chamber shallow and the tension of the globe markedly elevated. In short, the right eye presented all the typical appearances of an acute glaucoma.

Under the free use of eserine, with chloral and bromide of potassium internally, the pain gradually abated and the tension became less. I could not get the patient's permission to operate until the third day, when an iridectomy was performed with rapid and permanent relief to all the symptoms. She never regained her normal visual acuity, however, the eye being permanently damaged by the acute attack.

There can be little doubt that the dilatation of the pupil with the cocaine was the immediate cause of this attack of acute glaucoma in an eye already predisposed to it. When I saw the patient the pupils were much contracted and the tension was normal, but probably the temporary attacks of pain and dimness of vision were really the premonitory symptoms of glaucoma, and had I seen the patient during one of these attacks, with the tension probably elevated, I would have refrained even from the use of cocaine. Such a case must surely impress us more strongly than ever with the conviction that cocaine should never be used in any eye where there is the very slightest suspicion of glaucoma, and certainly should never be employed in the treatment of that disease.

Nor is there now any excuse in the treatment of glaucoma for incurring the dangers of cocaine for the sake of its anæsthetic effects. In August, 1898, in a paper on the use of holocaine read before the meeting

of the British Medical Association at Edinburgh,¹ I said, "Although I have not had, as yet, an opportunity of trying it, I would suggest that holocaine will be particularly useful as a sedative combined with eserine to relieve the painful attacks of glaucoma. In holocaine we have an anæsthetic which neither elevates the tension of the globe nor dilates the pupil, and hence is specially fitted for the treatment of such cases, having all the pain-relieving qualities of cocaine without its dangerous effects." Since making this statement two years ago I have had opportunities of putting it to the test of practice, and my experience of holocaine as a pain-relieving agent in glaucoma has amply fulfilled these anticipations.

I advocate the use of holocaine in glaucoma simply as a powerful agent for the relief of pain, which may be freely used without fear of any injurious effects. Iridectomy remains the remedy for the cure of glaucoma, but it may not be advisable to perform this operation at a certain time, or the patient may refuse an operation, or even after operation the painful attacks may still continue. Under all these circumstances holocaine with or without eserine will prove a great help to the ophthalmic surgeon in giving relief to the most distressing symptoms experienced by the patient.

In acute glaucoma, where there is dilatation of the pupil with shallow anterior chamber and chemosis of the conjunctiva, it may be advisable to postpone operation until we get the pupil somewhat contracted, and so secure a better chance of making an efficient iridectomy. Here holocaine is of great service both by relieving the distressing pain and also by increasing the rapidity of the action of the eserine. In two cases of acute glaucoma under my care I found it of the

¹ OPTHALMIC REVIEW, 1898, p. 199.

greatest service in this respect, using it in combination with eserine for twenty-four hours before operation.

Sneguiroff, of Moscow, has pointed out that the previous instillation of holocaine into the eye favours and quickens the diffusion of fluids from the conjunctival sac into the anterior chamber of the eye. In a paper read before the British Medical Association at Portsmouth in 1899 on "Euphthalmin,"¹ I pointed out as the result of numerous experiments, that the preliminary instillation of a drop of 1 per cent. solution of holocaine increases the rapidity and intensifies the mydriatic action of the euphthalmin. The preliminary instillation of holocaine has a similar effect as regards the eserine, increasing the rapidity and intensity of its action.

Holocaine, being a more poisonous drug than cocaine, must be used with caution; its toxicity as compared with cocaine is given by Hinz and Schlosser as five to one. It is, however, a very powerful anæsthetic, and very little of it requires to be used at a time. The instillation into the conjunctival sac of a couple of drops of a 1 per cent. solution is quite sufficient to produce the desired effect, and this can be repeated, if necessary, every three or four hours, without any evil results being feared.

My practice is not to combine the eserine and holocaine, but to instil the holocaine first and follow it in a few minutes with the eserine. This prevents the patient suffering from the unpleasant dragging sensation which is so often complained of after the instillation of eserine.

In cases of secondary glaucoma, such, for example, as arise from a rapidly swelling lens after injury, when there is great pain with elevation of tension, great relief can be given to the patient by the instillation of

¹ OPHTHALMIC REVIEW, 1899, p. 301.

holocaine without the danger of further elevating the tension, until measures can be taken for the extraction of the lens. I have used it with great success in a large number of cases of this class.

In short, for the relief of pain accompanied by elevation of tension, holocaine is pre-eminently the drug, for not only is there no risk of further increasing the tension, but its anæsthetic effects are decidedly greater than those of cocaine.

REVIEWS.

E. FUCHS (Vienna). *Nebulæ of the Cornea.*
Beiträge zur Augenheilkunde, xliv., 1900.

Some years ago the author drew attention to a peculiarity present in old-standing corneal opacities, to the effect that they may often be seen to be traversed by delicate transparent lines which, as the light falls upon them, seem black as contrasted with the bluish-white background of the scar. This appearance, which is very frequent, is, in Fuch's opinion, a proof that the condition has existed from childhood, that the lesion producing the scar has been a malady early in life, for it is, in his experience, only under such circumstances that these fine lines are seen running through the scar. They are not found as the result of ophthalmia neonatorum, however, nor of hypopyon ulcer, but only in cases of strumous keratitis (keratitis eze-matosa), for in them the nebulæ are less dense and less deeply seated. In many cases, but not in all, these fissures through the white show a sort of regularity in their design, running as they do in various parallel lines, crossing one another in various directions, and leaving between them rhomboidal spaces of denser opacity; they greatly resemble vessels, for which they may readily enough be mistaken,

but the opacity of vessels to transmitted light ought to save one from any error.

At first Fuchs was of opinion that these lines indicated the tracks along which nutrition was most active, namely, the course of the lymph paths, but his view now is that they may have to do with the growth of the cornea in the following way: he has observed that it is only when the lesion has affected a young, and therefore a growing, cornea that these lines are to be found, and since the mode of growth of a cornea is interstitial, new fibrils being formed in its substance, it is quite conceivable that the clear lines indicate areas in which new and transparent tissue is being, or has been, formed in the midst of the opaque region. In order to put this matter to the test he induced scar formation in the eyes of young rabbits, and studied carefully the appearances as these cleared up with the growth of the animal, noting particularly the spaces separating one small scar from another, and those between scar and corneal margin, with the view of determining whether the increase in the dimensions of the cornea was equal all over its area, or confined to certain parts. He found it difficult to use the galvano-cautery for the purpose of making scars without either burning too deeply, and so causing perforation, or using it too lightly and not obtaining a sufficiently permanent opacity. So he employed a brass terminal which he heated and held with forceps. With this he was able to draw upon the cornea lines crossing one another at right angles, and square figures, the separation of whose angles from one another, as well as from the margin and the centre of the cornea, should be read off subsequently with great ease by the aid of a lens. During the period of observation the diameter of a cornea might increase from an initial 9 mm. to 12 or 14 mm.

The results obtained by this method of investigation show that the line formation observed in the human eye is not found in the rabbit; that the marked points in the cornea of the rabbit became separated as growth advanced exactly in proportion to the general growth of the cornea, and that the development of the cornea is therefore equal

all over its extent, so that the relative distances of scar from scar, of scar from periphery, and of scar from centre, are exactly the same at the end as they were on the day of cauterisation; in fact, the appearances three months after the application are precisely similar to those which the cornea presented immediately after cauterisation, when seen through a somewhat more highly magnifying lens.

W. G. S.

SELENKOWSKY. Toxin Experiments regarding the Pathogenesis of Sympathetic Ophthalmia.

Klinische Monatsblätter für Augenheilkunde. Supplement, 1900.

This paper, which originally appeared in Russia, is the outcome of a series of experiments conducted with the view of discovering whether sympathetic ophthalmia is due to the transference of toxic substances from one eye to the other. In the first place the author was able to confirm the impression of others, that the transference of soluble substances from one eye to the other by way of the optic nerve, if far from easy, is at least not impossible. For the purposes of his investigation he employed the filtered toxin of the staphylococcus pyogenes aureus of considerable strength, and in a first series of animals introduced the substance into the inter-vaginal space at the peripheral end of the optic nerve, which he divided at the point of entrance into the orbit. In a second series he introduced the toxin into the nerve nearer the eye, and in this series he did not disturb the anatomical relations of parts, or—unlike the other—apply any ligature to the nerve; while in a third series the toxin was introduced into the posterior half of the vitreous.

In the first series, the toxin applied to the inter-vaginal space of the nerve found its way not merely to choroid and retina, probably by way of the perivascular space surrounding the central vessels, but also to the ciliary body and iris, travelling thither by the perichoroidal space, and causing in all these situations violent inflammation.

The degree of reaction was proportioned to the concentration of the solution, while in the control experiments, in which pure bouillon was injected, these produced acute though very transitory œdema of the parts, but no inflammation.

In the second series, in which the injection was made into the inter-vaginal spaces of the nerve close to the globe, choroiditis and papillitis, as well as cyclitis and iritis, occurred; but the choroidal inflammation appeared to be less severe and less permanent in its results than that of the iris and ciliary body. The staphylococcus pus which penetrates into the sheath may even pass centrally and so find its way to the other eye, where it may give rise to a papillitis, iritis or cyclitis. Meanwhile the general health of the animals on which the experiments are conducted remains good.

In the third series, after several injections, the toxins may reach the other eye by way of the optic nerve, and there set up changes. In short, in all of the modes of conducting the experiment, changes precisely comparable to those of sympathetic inflammation can be set up in the second eye by means of toxins injected into the other or its nerve; the conclusion from which is, that sympathetic ophthalmia *may* be capable of taking its rise from the passage of toxins from one eye to the other; the experiments are consistent with this view, to which they may indeed be said somewhat to afford some support.

W. G. S.

R. L. RANDOLPH (Baltimore). The Regeneration of the Crystalline Lens. *Johns Hopkins Hospital Reports*, vol. ix.

The reproduction of the crystalline lens has not yet been demonstrated conclusively in human beings, but in the case of rabbits, dogs, and guinea-pigs, there exists abundant proof that after the extraction of the lens a new lens is frequently formed.

It is surprising that such a deeply interesting fact in

bistology should have attracted so little attention among ophthalmologists, especially when we consider how long ago the question was decided in the affirmative, and how confirmatory of the original experiments were the results of those who immediately afterwards took up the solution of the problem. That we are better able nowadays to throw light upon this question goes without saying, for we have infinitely better operative and histological technique than was ever practised in the days of Cocteau and Leroy d'Etoille, seventy-five years ago.

Randolph, starting with the work of these observers, reviews what has since been published on the subject, especially by Backhausen, Löwenhardt, Mayer, Middlemore, Textor, Valentin, Milliot, Gayat, Gonin, Wolff, and Erik Müller. He then reports the results of his own experiments.

In rabbits twenty lenses were extracted, and regeneration took place in eight cases. The form of the regenerated lens, when complete, differed in no respect from the lens which had been extracted. A lens of this character was obtained in four cases. In some cases, while regeneration had undoubtedly taken place, no lenticular mass was to be seen. Here there was usually a large mass of lens substance filling up the peripheral portion of the sac all the way around, giving a ring-shaped appearance to the formation, while the middle portion of the sac was filled with an amorphous granular mass. There were three lenses of this character. In one other case the regeneration did not extend all the way around, but possibly three-fourths of the way, presenting a mass which looked like a horse-shoe.

These account for the eight positive results. Usually one could make out even after complete regeneration the point in the capsule where the incision had been made—and not infrequently one of the borders would be found adherent to the iris.

There is a most important point in these experiments, and one which has never been sufficiently emphasised, namely, that lens substance is always left behind after

an extraction, no matter how smooth the extraction may have been. Lens fibres are invariably scraped off in the delivery of the lens. Still stronger evidence of this is seen when the eye is cut open and the capsule is examined under a high-power lens. The lens substance left behind seems to be most abundant in that part of the sac opposite the incision in the capsule, evidently having been scraped off in the passage out of the lens. There are also to be seen lens tubules, a granular amorphous mass, pigment cells, and now and then blood-corpuscles.

It was quite noticeable, however, that the quantity of these elements was largely dependent upon the ease with which the lens was delivered. If the lens passed out with difficulty more of these elements would be present; but even in the smoothest extraction some lens was always left behind, and would be found generally, even if nowhere else, on the posterior capsule opposite the incision in the anterior capsule. Within the capsule were to be seen the "Bildungszellen" of Becker, and from these the lens fibres are regenerated.

In those cases where there had been a mild iritis the regeneration was apt to be more satisfactory. This was, no doubt, to be attributed to the greater vascularity of the surrounding parts: in other words, to the formation of new blood-vessels in the ciliary body and on the posterior surface of the iris, the conditions which are usually present in inflammation of this part of the eye. Milliett went so far as to say that in those cases where there was no reaction after the operation there was generally no regeneration. As a matter of fact iritis was rarely absent in Randolph's cases.

In one of the cases which gave a positive result the lens, found at the end of eleven months, was quite as large as the normal lens of the rabbit. Randolph concludes that:—

Regeneration of the lens in the rabbit's eye occurs only when some portions of the lens are left behind at the extraction.

Removal of the lens in its capsule is followed by a negative result.

The volume of the regenerated lens may be equal to that of the original lens.

The regenerated lens is usually lenticular, though sometimes it is ring-shaped, and at other times semi-lunar.

The reason why positive results occur less frequently than negative is because we are unable to protect the animal from infection after the operation. We have nothing to take the place of the after-treatment, which is always employed in cataract operations on human beings.

Theoretically, one would suppose that the longer the animal was allowed to live the greater would be the volume of the regenerated mass. This, however, was not the case in these experiments. In one instance, where an animal was killed fifteen months after the extraction of its lens (case not reported among the twenty), the regenerated lens was about equal in size to one where the rabbit was killed after only six weeks.

The observation of Colucci, Wolff, and Müller, that after removal of the lens of the triton in its capsule it is regenerated from the epithelium of the iris, seemed so astonishing that Randolph undertook a series of experiments to test its correctness.

In the first place he extracted the lens of the newt ten times to find if it commonly was completely removed in its capsule. A careful study of serial sections of these eyes failed to reveal in a single case the presence of either any lens substance or of any cells from the capsule. Then, in ten experiments on newts he obtained regeneration of the lens from six. All the lenses from these eyes were cut into sections and *every* section removed. In but one was there any break found in the lens capsule. He concludes that in the newt extraction of the lens is followed by regeneration, which occurs even when the lens has been removed in capsule; so that the new lens must take its origin from tissue having a different physiological value; and, as the experiments of Wolff have shown, this structure is the iris.

Randolph is not sure that the phenomena described in these experiments find any conspicuous analogy in the history of cataract in human beings (see OPTHALMIC REVIEW, 1900, p. 95). We are not in the habit of extracting healthy lenses, and it is not unlikely that this may make some difference. But we certainly do observe (and that, too, very often) great activity of the capsular epithelium after the extraction of a cataract. May this not be an attempt at regeneration—an attempt which is so often successful in creatures lower in the animal series?

E. J.

TERRIEN (Paris). Interstitial Keratitis in Herpes Ophthalmicus. *Archives d'Ophthalmologie*, August, 1900.

Some affection of the eye is of course very common among the cases of herpes attacking the region of distribution of the first division of the fifth nerve, and particularly (though not, as at one time believed, invariably or only) when the nasal branch suffers. Of all the ocular manifestations the most frequent is an eruption of vesicles on the anterior surface of the cornea which usually take a long time to heal soundly, but lately a number of other developments have been noted, including paralysis of ocular muscles, optic neuritis, and interstitial keratitis. But whatever of these developments may show itself, it is always later in time than the appearance of the cutaneous alterations. Of course such a keratitis may arise consecutively to corneal ulceration, but it is not to such that Terrien refers, but to those which begin as a keratitis, entirely without any preceding ulceration, as having been already described. Whether these cases are all genuine, and the keratitis has not really been preceded by a transitory superficial loss of substance, is a question which might well be discussed. All such cases, at all events as have been recorded, had exhibited this lesion at a considerably advanced stage in the course of the cutaneous

affection. The case, however, which M. Terrien now records has a totally different complexion; it is that of an interstitial keratitis preceding by several days any symptom of the outbreak of zona which followed it. A married woman, 59 years of age, presented herself on account of a feeling of discomfort in the left eye, which had come on suddenly. There was some hyperæmia, confined entirely to the upper outer portion of the corneo-scleral junction, with a little pain and tenderness to touch. The appearances suggested a superficial scleritis of rheumatic type, and the patient described herself as a rheumatic subject, but over the corresponding area of the cornea, as well as in the upper inner segment also, there was a diffuse infiltration; this was unmistakably in the substance of the tissue, and did not in any way affect the epithelium; the pupil was contracted. In spite of treatment the condition remained the same until about fifteen days after the first onset, when a copious vesicular eruption broke out in the forehead, preceded by severe pain in that region. Four or five vesicles, each about the size of a pin's head, appeared on the corresponding portion of conjunctiva, and the corneal sensibility in the area involved, as well as cutaneous sensibility over the forehead, was found to be diminished. The affection gradually passed off, lasting in all about two and a-half months, but fortunately permitting vision to return to normal. The author is not aware of any previously recorded case in which the corneal affection preceded the cutaneous, and reports the case as being unique.

W. G. S.

SEIFFER (Berlin). Hemicrania with Recurrent Paralysis of the Ocular Muscles. *Berliner Klinische Wochenschrift*, xxx., 1900.

The question of the precise origin of those curious cases, first fully described by Möbius in 1895, of recurrent paralysis of the third nerve, has never yet been definitely settled, and it is still matter of uncertainty whether the

lesion is basal or nuclear. Those cases are of peculiar interest in which hemicrania accompanies this recurrent paralysis. Möbius does not, however, consider that between the paralysis and the true hemicrania there is any real relation, but rather that the head pains and other nerve symptoms are merely symptomatic; he thinks it probable that the headache is due to the irritation of the root of the fifth nerve by the lesion which he supposes to exist in the nuclei of the third. As he points out, certain of the characteristics of true migraine are conspicuously absent, notably the hereditary history, the neuropathic diathesis, the aura, the regular recurrence after a comparatively brief intermission, and the short duration of each individual attack. But since the time when Möbius thus expressed himself, a number more cases have been placed on record, some of which negative certain of his arguments; for example, this precise condition has been transmitted from father to child.

A case, of which the following are the condensed notes, is of interest. A man aged 40, an upholsterer, applied for advice in consequence of suffering from severe headache. He stated that his mother had been insane, and had died in an asylum; his father drank a good deal. Hemicrania was not known among his relatives. Of his four living children (four others had died in childhood), two sons had for years suffered from headaches recurring every four or five weeks, and a daughter from occasional headache. The patient, who had not had syphilis, and who was not a drinker, had suffered like his sons from headaches ever since his eighth year; these headaches were situated in the left frontal region, the pain spreading back from there; even in childhood they had been so severe as often to keep him from school; the interval of freedom was usually about four or five weeks. He always knew the day before an attack was to come by experiencing a general feeling of dulness, along with much increase in his appetite; the next morning he would be sure to wake up with a violent headache. Each attack lasted at least two days, and often three, during which, besides the severe pain, there

were also other symptoms, notably complete loss of appetite, constipation, sickness, giddiness, lacrimation, along with the appearance of black (but never of coloured), specks floating before the eyes, and he was very irritable; during at least part of the time he was obliged to remain in bed. On the third day the symptoms would pass off and he felt "like another being." Restriction of the amount of food taken during the days preceding an attack had no effect whatever in warding off the pain. A curious point which he observed was that the usual period of recurrence was every four weeks, almost to a day, but if the attack was delayed beyond the proper time it was sure to be much more severe, while if it should occur too soon it was milder. It was about ten years ago that he first noticed a tendency for the left eye to diverge, and for the lid to droop during his attacks, a condition which tended always to grow more marked, and for about eight years he has had double vision along with the ptosis; gradually there developed a typical recurrent paralysis of the third nerve, and as time went on the recovery of position between the attacks became slower and less satisfactory, until finally a permanent and quite complete paralysis of the third nerve came to exist. All this time the attacks of migraine continued to be present with their old regularity and severity. The fundus was, at the date of writing, quite healthy, and no other muscle than those supplied by the left third was implicated; there were no signs of any other nervous affection.

The record of the case is thus plain enough,—a man with a family history of neurotic liabilities has suffered from hemicrania for thirty years, with first partial, then complete paralytic seizures of the third nerve on the same side as the headache. This paralysis has now become permanent; he is certainly not syphilitic, and from the history it seems impossible that a neoplasm can exist. Hemicrania is a fairly common disease, yet how very rare (though not unknown) are any objective signs of its presence visible; and as Möbius points out, if there were any close or necessary relation in such cases as that just

recorded, one would expect that this would be much more frequent, but on the other hand one does not know precisely what individual local conditions may be present to favour such changes in rare cases. It is probable that some of the previously published cases too, to which Möbius' criticism refers, were really cases of recurrent paralysis of the third nerve along with headache, but neither headache nor paralysis was in the true sense periodic, and the headache not a genuine migraine.

The question of the site of the lesion is somewhat difficult ; one has to fall back upon the suggestion of some disturbances of circulation about the nuclei or roots of the third nerve, possibly of the nature of an auto-intoxication, leading to a paralysis first occasional and then permanent. Basal lesions, which may in some sense cause similar symptoms, can hardly produce true hemicrania without other complicating conditions.

W. G. S.

CLINICAL NOTES.

TUBERCLE OF THE LACRIMAL GLAND.—Mr. Jessop describes an interesting and possibly unique case. It was that of a youth of 18, who for six months had noticed a small lump growing below the upper edge of the orbit ; this was accompanied by slight dull aching pain. He showed evident signs of a tubercular diathesis. When he came under observation the tumour was as large as a walnut ; the skin over it was a little reddened, but not adherent to the growth ; at its upper part it was attached to the orbital wall ; it was not tender on gentle pressure ; the eyeball was displaced downwards to a considerable degree, but its movements were not interfered with. At this period there were also signs that the lungs were not sound at their apices. The growth, which was breaking down, was removed without difficulty through an incision below the upper margin of the orbit. The late Dr.

Kanthack examined it and reported that it was tubercular in nature, and had its origin in the lacrimal gland.—*St. Bartholomew's Hospital Reports*, xxxv., 1899.

MIRROR TEST FOR SIMULATED BLINDNESS.—To the many methods for the detection of fraud in regard to the state of vision, Fridenberg of New York adds another, which, though the underlying idea is not exactly new, has certain qualities to recommend it. To the sides of a spectacle frame which contains suitable lenses if necessary, and so placed as to stand out laterally from the sides of the patient's head, are fixed two test cards, printed either as illiterate types, or as mirror-writing, or with such letters (A, Y, O, &c.) as appear the same in reality and in a mirror. From the nose-piece there runs straight forwards a bar with a handle, and to the bar at either side of it can be fastened a mirror, which in its turn can be readily rotated about a vertical axis, the degree of movement being registered upon a scale at the back of the mirror. The patient can read in the mirror the type at either the right or the left side of his head, and with either the right or the left eye, but in no position of the mirror can print be read with both eyes. Thus, placing the mirror before the right eye, at 95° the right card is seen by the right eye, at 90° it is seen by the left eye, at 70° the left card is seen by the right eye, and at 60° by the left eye. If one places the mirror before the left eye, he can of course produce the contrary effects. It is manifest that this plan gives us a considerable range through which one can work, varying the position of the mirror by very slight and almost imperceptible degrees, yet by so doing altering the conditions of vision in a manner very puzzling to the patient. One simple but valuable point is this, that when one places the mirror opposite to the sound eye, and at 90° , the patient sees his own sound eye in it with his sound eye, yet the card which he sees at the same moment he sees with his "blind" eye: it would take a very astute patient to maintain the fraud under these conditions.—*New York Medical Record*, March 17, 1900.

Schmitz, of Dortmund, has devised a somewhat similar method for the detection of malingering, also by means of a mirror reflecting into either one eye or the other at will, the details of the mechanism being however differently worked out.—*Wochenschrift für Therapie und Hygiene des Auges*, 21, 1900.

BLENNORRHŒA NEONATORUM CAUSED BY PSEUDO-INFLUENZA BACILLUS.—An infant of ten days was brought to zur Nedden, at Bonn, suffering apparently from an ordinary ophthalmia neonatorum, with abundant discharge of pus from both eyes. On enquiry it was found that immediately after birth the right eye was watering and slightly swollen, while the left was not yet open; next day the swelling was worse and the discharge purulent, and the left eye was watery, but very soon this also began to discharge pus. The immediate microscopic examination of the discharge gave no definite information as to the nature of the causative organism, so it was thought advisable to make cultures. Into the details of the results it is not necessary to enter; gonococci, however, were not found, but in addition to a few staphylococci there were colonies, extremely small in size, suggestive in appearance both of pneumococci and of gonococci, but not precisely agreeing with either in all points. The rod-shaped organisms were decolourised by Gram's treatment, would not grow on glycerine-agar or Loeffler's serum, but flourished on blood-agar. Various other points in regard to growth enabled the author to identify the organism as the pseudo-influenza bacillus, details of which are carefully recorded. The question of its mode of plantation upon the conjunctiva was not very easy of solution; the fact of its onset immediately after birth suggested an origin similar to that of the more ordinary forms of ophthalmia, but the mother had had no leucorrhœa, and actual examination of the vaginal and urethral secretion was negative as regards this bacillus; nor was it likely that an intra-uterine infection by the blood path could account for the condition, since the organism cannot as a rule be demonstrated in the

blood. It was probable that it must have been due to infection of an injury at the time of parturition, for the child was born by breech presentation, and no skilled assistance had been sought in time; it was thus not improbable that the hand of the midwife had infected the eye. A further point of importance was that shortly before her confinement the mother had suffered from a catarrhal affection of the lungs, which had not quite ceased. It is also noteworthy that the pseudo-influenza bacillus has been found guilty of causing purulent inflammation of the middle ear in infants; in this particular case there was no such condition. The author states that just about the same time he had occasion to treat two cases of catarrhal conjunctivitis—in a mother and daughter—also due to the same organism.—*Klinische Monatsblätter für Augenheilkunde, Stuttgart, March, 1900.*

THE VALUE OF IRITIS AS A POINT IN PROGNOSIS IN SYPHILIS.—The appearance of iritis, says Trousseau, in any case of syphilis must be regarded as a sign that a profound infection of the whole organism with the poison of syphilis has taken place; and, indeed, he seems to go the length of saying that the worse the local affection is, the more severe and far-reaching will the other manifestations of the malady be. After he had become convinced of the general truth of this rule, he was able to take notes of 61 patients who came suffering from well-marked syphilitic iritis. The after-history of 40 of these he was able to trace. Of these 40, 8 have not had any further serious troubles, 9 have been attacked in other systems than the nervous, 3 are the subjects of general paralysis, 12 became tabetic, 8 have had various cerebral manifestations of syphilis, and 2 have died, there being reason to believe that the cause of death in each case was a syphilitic lesion. Even if one takes it that all the untraced 21 were mild cases of syphilis and no further evil happened to them, the fate of the 40 ought to make us regard as very serious the condition of a patient presenting the features of syphilitic iritis.—*Annales d'Oculistique, May, 1900.*

TOXIC SYMPTOMS PRODUCED BY ESERINE.—In an old man whose arteries were atheromatous and who suffered from typical chronic glaucoma, Roubinovitch observed toxic symptoms to arise after eserine solution ($\frac{1}{2}$ per cent.), had been employed twice a day for three years. After he had used it for eight months each instillation produced a series of symptoms besides the myosis, viz., slight elevation of the rectal temperature, followed by a somewhat greater lowering, increased rapidity of the heart with a little irregularity in frequency before the normal was again reached, tonic contractions of the limbs, no doubt of central origin, various psychic and sensory disturbances, for example, loss of the precise sense of situation, visual and tactile illusions, and stertor. Cessation of the use of eserine caused all these symptoms to disappear. It was probably in virtue of its stimulating action upon the sympathetic and its contracting power upon unstriated fibres that the drug produced these effects, they were due to contraction of the walls of the nutrient vessels of the cortex.—*Recueil d'Ophthalmologie*, April, 1900.

THE CAUSES OF IRITIS.—It has seemed to Michel that albuminuria is a more frequent predecessor of iritis than it has hitherto been supposed to be, and he admits that until very lately it had not struck himself, as now on enquiry he finds to be the case, that albuminuria was a cause so potent. As the result of careful investigation into the general health of every patient who presented himself suffering from iritis over a considerable period of time, he comes to the conclusion that cases of iritis may thus be classified:—

(1) In patients with hereditary liability to tuberculosis, as a lesion localised in and limited, or apparently limited, to the iris and the eye.

(2) Iritis along with other tubercular lesions of lungs and glands.

(3) Iritis in precisely similar persons, but with albuminuria in addition.

(4) Iritis in patients with chronic nephritis.

(5) Iritis in diseases of the circulatory organs.

(6) Iritis in syphilis.

(7) Iritis in various other systemic diseases.

He finds, on comparison of notes regarding eighty-four patients, that the disease is more common among women than among men, that most frequently only one eye is affected, and that tuberculosis (taking together the first three classes) is responsible for 36·8 per cent. of all cases. He finds that chronic nephritis accounts for 34·5 per cent., but what is more astonishing, and does not at all coincide with generally accepted views, syphilis in his list only is responsible for 5·9 per cent. He is of opinion further that chronic nephritis and diseases of the circulatory apparatus play a considerable part in the causation of interstitial keratitis.—Michel, *Münchener Medicinische Wochenschrift*, 25, 1900.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, OCTOBER 18, 1900.

G. ANDERSON CRITCHETT, M.A., F.R.C.S.Edin., President,
in the Chair.

Cases of Blindness from Bullet-wound of Orbit.—Mr. Nettleship. This paper dealt with the effects produced by the passage of a bullet through the orbit without the globe being touched. These wounds were followed immediately by free bleeding into the vitreous, and as this cleared up by various and mixed appearances of choroidal rupture, choroido-retinal exudation, and changes at the disc without softening or shrinking of the globe or any signs from beginning to end that the sclerotic was ruptured or cut through. The first case of this sort that had been described was that of Cohn and Waldeyer, after the Franco-German war in 1871, a case in which the changes had first been observed ophthalmoscopically, and afterwards confirmed by anatomical examination. Other cases had been described at that time, and also after the Russo-Turkish war of 1877. Mr. Nettleship gave notes of six cases, four of which were certainly cases in point. They fell into two classes, according to whether the optic nerve had, or had not, been severed. In two of his cases it probably had, and these were

the cases in which bleeding into the vitreous was most free. (In a later part of the paper the author compared these cases with the effects of optico-ciliary neurectomy.) In other cases the bullet track was far from the nerve, and in one of his cases the bullet could not have been anywhere less than 5 or 6 mm. from the sclerotic. In this case, and wherever the projectile unmistakably traversed the orbit, the damage was at that part of the fundus nearest to the bullet track, whereas in two cases in which there was some doubt whether the orbit was actually entered, the fundus changes were at a part remote from what seemed to be the wound path.

The explanation of these phenomena which Prof. Stevenson, of Netley, had put forward, and which the author supported, was that the intra-ocular changes were the results of vibrations which radiated from the path of the bullet, insufficient to damage the dense sclerotic, but sufficient to pass through it and cause serious mischief to the more delicate choroid and retina. This explanation was supported by experiments with uncovered cylindrical vessels of thin sheet lead, through which bullets were shot, first when empty and then when filled with water. In the first case clean entry and exit holes were made without further damage to the vessel, but in the second, a great bulging in the track of the bullet was produced, and the exit hole was large and jagged, showing that the vibrations set up in the water had been active agents in producing the injury.

Besides the intra-ocular changes in these cases, there was generally more or less ophthalmoplegia, ptosis being the commonest sign. This could also be explained by vibration injury to muscular attachments. The free bleeding which occurred in cases where the nerve had been severed, he explained by vibration-injury to the most vascular part of the choroid at the posterior pole.

The President, Mr. Donald Gunn, Mr. Hartridge, Mr. Gruber, Mr. Johnson Taylor and Mr. Treacher Collins, all mentioned cases in point, many of them having recently occurred in South Africa. In reply, the President suggested that details of all such cases should be sent to the Secretary.

Orthoptic Treatment of Convergent Strabismus.—Mr. C. Worth. The author described a method of educative treatment in young children, which he had carried out for many years, by which the faculty of binocular vision was developed in squinting patients, even in those cases in which squint could not be corrected by glasses. The only hopeless cases, he found, were those of alternating squint

not corrected by glasses. If the faculty of binocular vision was once developed it would not be lost, and when the child was old enough for a tenotomy he could be trusted to correct for himself any slight error that remained after the operation, owing to the desire for fusion which resulted from the treatment. The method he had devised was adapted to interest children even so young as three years old. To test the acuity of vision he got them with one eye bandaged to run after ivory balls of different sizes rolled to the far end of the room, and if he found the vision of the squinting eye one-fourth that of the good eye, he considered it worth while to proceed with the treatment. He had invented a stereoscope which could be set to any angle to suit the varying degrees of squint, and in which the illumination on the two sides could be varied. For slides he employed such pictures as would be sure to engage a young child's attention, such as a bird in a cage, the bird before one eye, the cage before the other. The first difficulty to overcome was the suppression of the image in the squinting eye; for instance, the cage alone might be seen, the picture of the bird being before the squinting eye. To overcome this the illumination of the cage picture was gradually reduced and the child told to look for the bird. When he succeeded the first stage was attained, that of simultaneous macular perception, and then the illumination of the two pictures was gradually approximated. He found once a fortnight often enough to give these lessons, without any ground once gained being lost; and when simultaneous macular perception was acquired, which was generally very soon, he proceeded to elicit the power of fusion by slight variation in the angle at which the two tubes in the instrument were set. This generally took longer than the first stage. Finally, the sense of true perspective was tested by pictures of a glass tumbler, the child being asked whether it was up-side down or not. When the child could always answer correctly his power of binocular vision might be considered complete, though the squint might continue until set right by operation.

In answer to the President the author said he had treated some 300 cases by this method with most encouraging results.

Case of Cysticercus in the Eyes.—Dr. David Wood. This paper was read by Mr. Nettleship. A cook who had been with the troops on the Modder River, and who had consequently drunk Modder River water, had been seen on April 6 by Dr. Wood, in Cape Town, who then diagnosed a cysticercus in the eye. Four weeks later the cyst had grown and the movement of the "head" with the circle of hooklets was plainly visible. In August the

patient had come to England and been seen by Mr. Nettleship and several other members, the movements of the animal being still visible. As all sight had gone the question of operation did not arise.

Mr. Lang enquired why an operation had not been undertaken in the early stage if, as he understood, the cyst at that time was sub-retinal.

Mr. Nettleship doubted whether this was the case.

Dr. Little said he had during his lifetime seen five or six cases of cysticercus in the eye. In two he had operated, but no good had come of it, and he thought that in any case the prognosis was extremely bad.

CARD SPECIMENS.

Rupture of Nerve Fibres at the Optic Papilla.—Mr. Lang. This injury occurred in a boy as the result of a blow with a wooden clothes peg, without any wound of the globe. About half of the nerve fibres at the papilla had apparently been torn across and retracted within the sheath, a large amount of hæmorrhage and exudation occurring in the neighbourhood, and a defect in the visual field corresponding to the injury.

Double Frontal Sinus Mischief simulating Symmetrical Exostoses in the neighbourhood of the Lacrimal Sac.—Mr. John Griffith. The patient was a boy aged 15. On each side of the nose a tumour was present, that on the left side having started growing four years ago, and having remained stationary for two years, that on the right side being of only eight months' duration. On each side the tumour consisted of a firm bony base with an elastic (? fluctuating) area on its most prominent part. The left eyeball was displaced outwards, but there was no diplopia, and no interference with the ocular movements. The elastic part was not a distended lacrimal sac since both ducts could be freely syringed through. Mr. Griffith had at first regarded the case as one of symmetrical exostoses, but he was now inclined to agree with the members who regarded it as a case of bilateral distension of the frontal sinus.

A Case of Trichromatic Colour Blindness.—Dr. F. W. Edridge-Green. The patient, a man aged 33, saw three colours in a bright solar spectrum, namely red, green and violet. About these he was never in doubt and always named them correctly. Blue, yellow and orange, he said, ought not to have names, and he was very uncertain about them. He would take a blue and put it with the violets, then move it away and put it with the greens. Finally, he

put it in another class which contained as many greens as blues. "A man with this colour perception would be unsafe at sea because he would be unable to distinguish the front lights from the side lights." He had, however, passed Holmgren's test without touching a single confusion colour. A very interesting point about the case was that his sense for *light* of all colours, yellow and blue included, was much more acute than the average.

Tuberculosis of Conjunctiva.—Mr. J. Herbert Fisher. The case occurred in a young man aged 18. The conjunctivæ of both upper and lower lids presented a cauliflower-like appearance, due to flat topped excrescences closely pressed together. There was much glandular swelling on the affected side. A microscopic section from the case exhibited the typical structure of tubercle, though no bacilli had as yet been discovered. Mr. Fisher asked for suggestions as to treatment.

Mr. Johnson Taylor suggested the application of lactic acid, beginning with a 25 per cent. solution and going up to a 90 per cent. solution.

The President suggested ethylate of sodium.

Diminished Tension and the Appearance of Optic Neuritis persisting for nine months after a Wound of the Orbit from a Shot with an Air-gun.—Mr. E. Treacher Collins and Dr. J. S. Hinnell. Immediately after the accident tension was noted as — 3, though no wound of the globe could be discovered, and the subsequent discovery of the bullet beneath the conjunctiva seemed to prove that none can have been inflicted. There was congestion of the globe at the time, but no intra-ocular lesion except a streak of blood on the lens capsule. A fortnight later optic neuritis was first noted, with some vitreous opacity and choroiditis. The eye was hypermetropic, about 7 D. The case proved that low tension after an injury was no proof that the globe had been ruptured.

Voluntary Bilateral Nystagmus.—Mr. H. Work Dodd. The patient, when asked to exhibit his accomplishment, opened his lids wide, looked forwards, and "shook" his eyes from side to side, the nystagmus being rapid and the excursions short. He could also display a high degree of internal squint at will. Otherwise the condition of the eyes was normal, except for a patch of choroiditis acquired since the time when he had discovered his peculiar faculty.

Double Cataracts developing after Typhoid Fever, contracted in South Africa by a soldier, aged 22.—Mr. E. Kenneth Campbell.

Double Congenital Lacrimal Fistulæ.—Mr. Grimsdale.

A CASE OF AMBLYOPIA DUE TO EXCESSIVE TEA-DRINKING.

BY R. WALLACE HENRY, M.D., LEICESTER.

AFFECTIONS of the eye, due to excessive tea-drinking, although referred to in most recent text-books of ophthalmology, are still of sufficiently rare occurrence to render each fresh case deserving of record. Casey Wood, of Chicago, believes that asthenopia¹ and amblyopia² may both be traced to this cause; and de Schweinitz³ includes tea among the many articles, the undue consumption of which may result in toxic amblyopia. Berry, while not having met with a case in which other factors could with certainty be excluded, admits the possibility of intoxication amblyopia from tea.⁴ An affection of the vitreous of a degenerative character was ascribed to the tea habit by Dr. J. W. Wolfe, of Glasgow, in a paper read before the British Medical Association in 1879, but several speakers afterwards expressed some doubt as to whether other causes should not be looked for.⁵

Kenneth Campbell, in a paper read at the Twelfth International Medical Congress at Moscow in 1897,⁶

¹ De Schweinitz and Randall, "Text-Book of Diseases of Eye, Nose and Throat," vol. i., p. 466.

² *Ibid.*, p. 459.

³ Norris and Oliver, "System of Diseases of the Eye," vol. iv., p. 830.

⁴ *Transactions of Ophthalmological Society of United Kingdom*, vol. vii., p. 91.

⁵ *British Medical Journal*, 1879, vol. ii., p. 328.

⁶ *Lancet*, 1898, vol. i., p. 717.

described at some length a case of toxic amblyopia due to tea, the chief features being the following:—

Patient, a man aged 46, had noticed sight failing for six months, till it amounted to $\frac{3}{80}$ each eye, unimproved by glasses; the media were clear, and the fundus appeared healthy; the fields for white were normal, and there was a "partial central scotoma for red;" the general health was good; he smoked three pipes of shag a day and took one glass of beer. Smoking was stopped and *nux vomica* ordered. As there was no improvement for two months, further enquiries were made, and the fact that he drank about twelve cups a day of strong cheap tea was elicited. Tea was now forbidden, and tobacco and beer in their former quantities were permitted. From this time there was a steady improvement, till four months later vision had improved to $\frac{6}{9}$.

This case has been referred to for purposes of comparison with that of a man who was under my care for some months during the past spring and summer.

A man, aged 57, a shoe hand, complained that for some months he had been troubled by a dazzling mist before his eyes, which came on as the day got brighter, especially troubling him at his work, and passing off towards the afternoon; although formerly he could see any distance, now he could neither see clearly when going about, nor close to him with glasses for long together when it was dull, nor at all when it was bright. I saw him on April 28, when vision in the right eye = $\frac{6}{24}$, in the left eye $\frac{6}{18}$ partly; with + 1.5 D sph. vision in each eye was $\frac{6}{8}$ partly. Near V. = Jaeger 2 with + 4.5 D. sph. each eye. There was a small central scotoma for red in each eye, the field for white being full. On examination the anterior chamber was of normal depth, pupil small and active, media were clear, and the fundus apparently normal in each eye. The tension was normal, as was also the light perceptive power in each eye; the tendon reflex at the knee was present and normal; the general health was good, and

there was neither albumen nor sugar in the urine. On enquiry I found that he never smoked nor used tobacco in any form, and never exceeded a pint of bitter beer a day.

After further questioning I discovered that he was "always drinking strong tea"—"no cheap stuff for me"—"3s. 4d. a pound specially blended for myself"—"six ounces of black with two of green tea." Tea was absolutely forbidden, and as he had slight dyspepsia I ordered him some bicarbonate of soda and nux vomica. During the month following, while he said the dazzling was less, vision remained unaltered.

June 9.—Distant vision as before; near V., Jaeger 1, with + 4.5 D. sph.; ordered potass. iodid. with nux vomica.

June 30.—Vision was $\frac{6}{8}$ each eye with glasses; dazzling less.

July 21.—No trouble with work; no dazzling; vision normal.

The facts of the case all point to a mild toxic amblyopia; while the absence of the other usual causes, together with the improvement on leaving off tea-drinking, would seem to indicate that tea was the probable factor in causing the trouble.

REVIEWS.

GIUSEPPE MANZUTTO (Vienna). On Primary and Traumatic Band-shaped Corneal Opacity. *Beiträge zur Augenheilkunde*, xlv., 1900.

In this article the author has recorded two cases of band-shaped corneal opacity which he had an opportunity of observing in eyes which were the subject of senile cataract, but were otherwise healthy, and three cases of a similar affection also in normal eyes, previously observed by Professor Fuchs; and he has brought together twenty-three cases of the same condition previously recorded in the literature of the subject. The primary form of this affection

is rare, and develops most frequently in those well advanced in years. Vision slowly diminishes and there is often slight dazzling and also lachrimation when the eyes are exposed to light. The opacity develops in the part of the cornea exposed in the half open palpebral aperture, and has therefore an almost horizontal direction and lies a little below the horizontal meridian. It begins either at the outer and inner parts of the cornea as two separate patches which gradually extend towards the centre of the cornea where they may become confluent, or the opacity begins at the centre of the cornea and spreads in a horizontal direction towards both sides: its edges are usually sharply defined. In most, but not in all cases, the opaque area is separated by a zone of normal transparent cornea from the corneal margin at both sides. The opacity, usually of a grey or brown tint, has a finely granular appearance, and in typical cases has a smooth surface. As a rule the primary form is more delicate and has a smoother surface than has the secondary. The development of the affection is very slow, and it appears that when the opacity has extended to a certain degree it remains stationary. It is generally bilateral, and has been observed almost exclusively in men. Occupation seems to bear no relation to this variety of band-shaped corneal opacity. It is difficult to prove that the primary form has any relation, as v. Graefe supposed, to glaucoma; in almost all of the cases there has been no glaucoma, and in cases where the glaucoma has arisen it may have been a fortuitous coincidence since glaucoma is so frequent in old people.

The origin of this peculiar corneal affection is to be found in a diminution in nutrition. The cornea in the secondary form loses the necessary power of resistance against external deleterious agents owing to its trophic conditions being so affected by extensive disease of the eyeball. In the primary form the nutrition of the cornea is diminished by senile involution dependent on senile atrophy of the conjunctival limbus with subsequent involution of a part of the vessel loops, and on attenuation of the entire cornea in advanced age. But diminished nutrition is not sufficient

of itself to explain the peculiar band-shaped opacity, for this occupies only a small part of the cornea. The reason why the cornea becomes affected at the part corresponding to the palpebral aperture is attributed by the author, as has been usual, to its exposure at this situation to external agents which, had the cornea been normal, would have caused no reaction. The author has not ascribed any influence to the pressure of the lids on the cornea in determining the situation of the opacity, which according to a view recently advanced is another important cause which accounts also for the way in which the films begin and extend.¹

Manzutto considers that Leber's explanation of the physical processes in connection with these changes is plausible, viz., that evaporation at the palpebral aperture causes a separation of lime salts from the nutrient fluid of the corneal parenchyma at that situation. If this explanation is accepted, then one must suppose that the composition of the nutrient fluid of the eye, and perhaps also of the blood, is changed in those in whom band-shaped corneal opacities arise; the nutrient fluid that passes from the vessels at the corneal margin into the corneal parenchyma must contain a greater quantity of lime salts than it normally holds in solution, and in that case the question is justified whether the gouty diathesis (Nettleship) or in others senile vascular changes (Leber) could not contribute to the development of such a corneal disease. This peculiar form of corneal opacity can develop even in normal eyes which are exposed for a long time to wounds from foreign bodies whereby the cornea is kept in a state of constant irritation—a traumatic form. In these cases the irritation produced by the foreign bodies in the exposed part of the cornea is the direct cause of the pathological changes.

Topolanski was the first to draw attention to this fact. He mentions in his work three cases which occurred

¹ Collins. Erasmus Wilson Lectures on the Anatomy and Pathology of the Eye. *Lancet*, February 17 and 24, 1900.

in hat makers: in this occupation little particles of the hair from the skins of the various animals utilised (especially hare skins) are constantly flying against the eyes of the worker.

In a fourth case keratitis *en bandelette* appeared after injury with sulphuric acid; a case described by Manzutto developed a similar condition after prolonged use of calomel to the eyes.

The treatment of primary and traumatic girdleform opacities consists in their removal by mechanical means or by the aid of acids. But it seems that the result of treatment by acids is not generally very satisfactory because in these cases there is not only a precipitation of lime salts, but there are also deeper changes in the corneal tissues, so that although the lime is dissolved by the acids, the tissue cannot become completely transparent. On the other hand the results of acid treatment are brilliant in cases of lime precipitation pure and simple, as two cases recorded by Birnbacher show. Iridectomy is indicated when there is a tendency to increased tension or when the opacity is dense, covers the pupil, and cannot be made sufficiently transparent by acids or mechanical means.

C. H. U.

GLAUNING (Erlangen). The Treatment of Septic Perforating Wounds of the Globe. *Münchener Medicinische Wochenschrift*, xxxi., 1900.

In the case of any perforating wound of the globe there are two questions of very great importance, viz., first, as regards the wound itself, its nature, precise situation, and size; and, secondly, the possibility of the introduction of sepsis, either at the moment of its infliction or between that time and its first presentation to the surgeon. On these points the prognosis largely rests. Considering how suitable a medium for the development of germs the interior of the eye is, and how powerless any of our means to combat a septic infection are, once it is established in

the contents of the globe; considering also the long duration and painful resolution of the reaction set up, as well as the unsightliness of the eventual result, it is small wonder that in cases which promise little, immediate removal of the injured eye is so often resorted to. At the same time every surgeon has had under his care exceptional cases in which the eye at the time seemed hopelessly destroyed, yet it healed up in a wonderful manner, leaving astonishingly little deformity and permitting a certain amount of useful vision. Most persons also would prefer to retain even a stone-blind eye, if it had any resemblance to an eye at all, rather than have it removed and wear an artificial one; and further, in these days of compensation for injury received at work, it is only to be supposed that a larger sum would have to be paid for an eye removed than for a—not less blind—eye retained. The facts, though mentioned by Glauning, that excessively rare cases seem to have occurred in which strange symptoms were caused by the wearing of an artificial eye, and that many persons are careless in their use of the same, can hardly affect our judgment as to the proper treatment of a case.

Prof. Eversbusch has treated a number of cases of grave injury in which severe inflammation had occurred, by establishing, by means of the galvano-cautery, a fistula of the anterior chamber, his idea being that one could thereby eliminate from the anterior of the eye much or all of the septic material. He employed the cautery at a red heat, and with it made his way slowly through the cornea, layer by layer, finally making an opening into the anterior chamber about the size of a pin's head. When hypopyon happened to be present the pus was thus allowed to escape, but no active steps were taken with a special view to its removal. If the original wound was linear and fairly long, he applied the cautery at one end of it, and in other circumstances simply chose that part of the wounded region which seemed most convenient. Washing out the conjunctival sac with salt solution and applying a binocular bandage completed the immediate treatment; pain seldom lasted more than a couple of hours and could be restrained

by the use of ice. Should inflammatory symptoms come on again, the cautery was reapplied, but not before the third or fourth day; and the same rule held good in reference to any fresh collection of pus in the anterior chamber.

The immediate effect of this puncture of the cornea with the cautery is, of course, to remove from the anterior chamber all of that infective material which is floating or mixed with the aqueous humour, and so reduce the amount of phlogogenic matter, but in addition to that benefit there is this other, that for some time the aqueous humour drains away as it is secreted, and thus a thorough flushing or washing out of the tissue of the ciliary body is kept up, which cannot fail to have a good influence upon the inflammatory process which has begun or which is about to begin. For this purpose the rounded aperture made by the cautery is very much more suitable than a linear wound made by a knife, since it will keep so much longer open. It is probable that a second advantage which is gained is that the reduction of tension, so produced and maintained, leads to an afflux of abundant fresh blood to the eye, one consequence of which must be a freer tissue exchange, and that the war against the septic influences will be conducted more actively, and under more favourable conditions, than formerly.

Three typical cases of bad injury treated according to the system which he has been describing are related at great length by Glauning, and, as he truly says, there may be room for differences of opinion regarding them, and the reader must decide for himself as to the success or failure of the method adopted. For his own part the present writer, though entirely agreeing that great efforts ought to be made to save useful sight, and though willing to admit that the method may in a number of instances prove useful, cannot but think that in at least two of the cases described more drastic measures would have been wiser after all, the serious risks run by the patients for very little good in the end would have been minimised, and a very much shorter time of vastly less discomfort would have

been spent by the patient. Still there are probably not a few eyes hovering on the borderland which may be saved from loss by this method, and may yet prove a gain in regard both to utility and to ornament.

W. G. S.

MERZ (St. Petersburg). The Pathogenesis of Choked Disc. *Archiv für Augenheilkunde*, xli., 4, 1900.

Under the guidance of Prof. Bellarminoff the author has conducted a series of experiments in dogs and rabbits with the view of determining whether increase of intracranial pressure alone is capable of so influencing the conditions as to set up choked disc. It does not seem to the reviewer that the experiments as described by Merz can really prove anything as regards the human subject, since it is obvious that the conditions of circulation, &c., in the skull of a dog subjected to, at most, a few hours of relatively enormously increased intracranial tension cannot be supposed to be at all closely analogous to those existing in any case of intracranial tumour in the human subject, but it may for all that be useful to note the conclusions at which the author arrives. These are briefly stated thus:—(1) Increased intracranial pressure is sufficient of itself to produce choked disc. The pressure must, however, be continuous; without the fulfilment of this condition choked disc is not produced. (2) The pressure need not be very great, but the greater the pressure the more rapidly is the pathological condition brought about. (3) Dilatation of the veins, soon followed by narrowing of the arteries, forms the earliest clinical sign of commencing choked disc. (4) The symptoms come on sooner the nearer to the globe the vessels of the optic nerve penetrate the sheath. (5) To this result both increased pressure in the venous sinuses, and compression of the nerve-vessels by the fluid accumulated in the sheath of the nerve contribute; probably also the interference with the lymph

circulation in the nerve on account of its direct compression, has an influence.

The anatomical conditions of the cerebral and optic nerve relations are similar in the dog to what they are in the man, but in the rabbit they are not so, consequently one cannot predicate much in regard to human affairs from what occurs in that animal. The author gives a useful *résumé* of the various theories propounded from time to time to explain the occurrence of choked disc.

W. G. S.

WILFRED HARRIS (London). The Significance and Pathology of the Argyll-Robertson Pupil. *Brit. Med. Journal*, September 29, 1900.

This paper was read in the Section of Pathology at the meeting of the British Medical Association in August, 1900, and in it the author gives the results of his investigations of this valuable physical sign of disease of the nervous system, and his views as to its pathology.

He states at the outset that loss of the pupil contraction to light may be considered an almost certain sign of antecedent syphilis, congenital or acquired.

In addition to tabes and general paralysis with a history of *acquired* syphilis, he has met with Argyll-Robertson pupil in juvenile locomotor ataxy and general paralysis with marked evidences of *congenital* syphilis, in progressive muscular atrophy, in lead poisoning, aortic aneurysm, hemiplegia, syphilitic meningitis, ataxic paraplegia, nuclear ophthalmoplegia, and in numerous patients who presented themselves for all manner of symptoms, but who showed no signs of ataxy or anæsthesia, and who had normal or even brisk knee-jerks, but with a clear history of syphilis in almost every instance. Harris has never seen the condition in Friedreich's disease or in insular sclerosis.

The loss of light reflex may be unilateral, but more often there is impairment of reaction on both sides, this being more marked in one than in the other.

The morbid anatomy of the Argyll-Robertson pupil has never been demonstrated, though it has been variously surmised to depend on a nuclear lesion, or on sclerosis of Meynert's fibres between the anterior corpora quadrigemina and the third nucleus, or even on a lesion of the ciliary ganglion. The third nucleus, or its anterior portion, is certainly included in the reflex arc, and it is not surprising therefore to find the phenomenon of reflex iridoplegia present in cases of nuclear lesion. That is not, however, sufficient argument for placing the usual site of the lesion in the nucleus, inasmuch as the vast majority of cases of Argyll-Robertson pupil are unaccompanied by any other sign of nuclear lesion. Analogy, too, would rather suggest sclerosis of certain fibres, in view of its frequent association with posterior sclerosis, in which lesion of nerve cells is a rare exception.

The study of the pupil-reflex in birds and animals, with and without binocular vision, proves that the two third nuclei are not tied together for the light reflex, since only the pupil exposed to light contracts; moreover, in birds and lower mammals there is complete decussation of the optic nerves at the chiasma, and it therefore follows that there must be also a posterior decussation of the fibres subserving the light reflex between the optic lobes and the third nuclei. It is highly probable therefore that in man and other animals with binocular vision, in whom there is semi-decussation of the optic nerves at the chiasma, a similar arrangement holds good between the anterior corpora quadrigemina and the third nuclei, *i.e.*, that there is a semi-decussation of the fibres subserving the light reflex between these two parts.

Meynert's fibres have been shown by Boyce and others to be not a complete decussation, some fibres remaining uncrossed in or close to the posterior longitudinal bundle of the same side, and it seems not improbable that these fibres have the above function. This being the case, it is no longer necessary to conceive the two third nuclei being tied together in order to explain the consensual reaction of the pupils to light, as light thrown on either pupil in

any direction will thus cause afferent stimuli to reach both third nuclei independently.

It seems to me much more probable then, says Harris, in the absence of direct pathological evidence, that the Argyll-Robertson pupil is due to sclerosis of these fibres on one or both sides according as the loss of light reaction is unilateral or bilateral, rather than to any nuclear degeneration.

J. B. L.

K. KIRIBUCHI (Leipzig). Experimental Investigations on Cataract and other Affections of the Eye produced by Lightning. *von Graefe's Archiv für Ophthalmologie*, l. 1.

At the suggestion of Professor Sattler, Kiribuchi has made experiments for the purpose of investigating the changes produced in the eye by strong electric discharges, and by the hyperæmia of the ciliary body which Hess has found to be the result of those discharges. The author experimented on the rabbit, and examined fifty-four eyes exposed to from 1 to 8 strong shocks from Leyden jar batteries. At the first shock applied to the supra-orbital region strong convulsions or a short tetanus is produced, followed by somnolence, rotary movements, dyspnœa and fibrillary contractions throughout the body. The shock is followed immediately by a strong miosis and anæmia of the iris. After a quarter or half an hour hyperæmia of the iris sets in and increases for a whole day, often accompanied by fibrinous exudation and even posterior synechiæ. Chemosis is not infrequent. Some time after the shock the cornea shows faint opacities, punctate and linear, which disappear in from five days to some weeks. In albinotic eyes the hyperæmia of the ciliary body can be seen about half an hour after the shock, commencing at the point of application of the current as a bluish-red swelling protruding between iris and lens, and gradually spreading round.

With regard to the lens two forms of opacity can be distinguished clinically: (1) an opacity commencing in

the equator of the lens and spreading quickly into the posterior cortex, but very slowly and slightly into the anterior cortex. This opacity spreads gradually round the nucleus and may develop into a complete cataract. This, however, occurs only when a strong hyperæmia of both iris and ciliary body exists, otherwise the opacity may remain stationary or disappear altogether. (2) An opacity in the anterior cortex. This is generally quite superficial and disappears more or less completely. Even with a strong hyperæmia of iris and ciliary body no tendency exists to produce a complete cataract, though the opacity may extend towards the nucleus.

The deeper tissues could not be examined ophthalmoscopically owing to the corneal opacity at first, and to the cataract in the later stages. The microscopic examinations of the structure involved, however, gave the following results :—

In the lens, opacity has already commenced after a few hours, either of part or of the whole anterior surface. If the hyperæmia of ciliary body and iris is not great, and is of short duration only, this opacity disappears again; in severe cases it increases, spreads, and may produce a complete cataract, due to the disturbed circulation.

The cornea shows at first an alteration of the epithelium, the stroma cells and the endothelium; later on the changes resemble those of interstitial keratitis.

In the conjunctiva a strongly marked chemosis and dilatation of the blood-vessels is seen; both, however, disappear soon.

The uveal tract is hyperæmic, and as a consequence there may occur even permanent degeneration of the ciliary body and its processes.

The choroid is also very hyperæmic, and to this condition may be attributed the atrophy of the retina and of the optic nerve.

The author considers as the primary cause of the injury to the tissues of the eye the electrolytic action of the electric discharge (lightning, &c.); secondly, the ultra-violet rays may possibly help to increase this effect.

K. G.

PURTSCHER (Klagenfurt). Contribution to the Knowledge of Ophthalmia Hepatica. *von Graefe's Archiv für Ophthalmologie*, l. 1.

Although affections of the liver and cases of severe chronic jaundice are of very frequent occurrence, the dearth of observations of associated eye diseases is remarkable, and there are only two cases on record of careful microscopic examinations of the affected eyes.

Purtscher had the rare opportunity of watching a typical case for seven months up to the time of death, and to obtain both eyes for pathological examination. He gives a detailed description of the case *intra vitam*, and of the result of the microscopic examination. On comparing his case with those described by others he comes to the following conclusions:—

Grave affections of the liver are sometimes accompanied or followed by both functional and organic characteristic changes in the eye. The original lesions affect the conjunctiva principally under the clinical picture of xerosis; in severe cases the cornea is also implicated. The uvea is often the seat of inflammation, complicated in grave cases by iritis. The main share in all cases however falls to the choroid.

The most prominent clinical symptoms are the xerosis and night blindness, both no doubt due to mal-nutrition. The xerosis may lead to ulcerative keratitis, to hypopyon, and secondarily to iritis.

The choroid shows a very marked hyperæmia and inflammation, followed by atrophy of the stroma and proliferation of the connective tissue. According to the degree of these anatomical changes the symptoms are more or less severe: decrease of the central vision, contraction of the visual field for white and for colours, reduction of perception of light, and finally disturbances of perception of colours. As a consequence of the disturbed nutrition of the choroid the pigment epithelium becomes implicated too; this is however a secondary process, and of a degenerative, not of an inflammatory nature.

As regards the explanation of the association of these deep lesions of the eye with the hepatic affections, three possibilities have to be considered, viz.:—

(1) The general nutrition might be affected by the failure of the bile to participate in the digestive processes, whereby the supply of nutritive material would be reduced both in quantity and quality. This would explain the night blindness.

(2) The admixture of bile with the blood (cholæmia) might alter the nutritive liquid sufficiently to irritate the tissues and to damage the blood-vessels and consequently the areas supplied by them. Such changes in the blood-vessels, especially of the retina and choroid, have actually been found in one case, though in three others they have been absent. It is, however, possible that the icteric nutritive fluid may become injurious to the tissue even without previous affection of the blood-vessels themselves. At any rate there are two points of importance with regard to the disturbed colour perception: (*a*) the purely optical effect of the colouring matter of bile in the refracting media of the eye, which acts like a yellow glass; (*b*) the circumstance that the bile acids are capable of extracting the visual purple, suggesting thereby the possibility of a direct injury to the function of the retina.

(3) The possibility of bacterial influence and etiology exists. In this respect the evidence of the few cases hitherto examined is not conclusive either way.

A *fourth* possibility, namely that the eye affection is produced by the action of some toxin, appears too remote to be considered. In none of the cases that were examined microscopically could any capillary hæmorrhage of the retina be found, whereas it is well known the retinal vessels are very vulnerable to the action of toxins.

The question of treatment is simple though not very promising; in the slighter cases the eye affections are generally very trifling or altogether absent; while in the more serious ones the destructive processes in choroid, pigment epithelium, and retina are too severe to admit of a complete restitution. As far as possible the treatment

has to be directed against the hepatic affection; and although it will only be in exceptional cases that this can be done effectually, it is of great importance to keep the state of nutrition in good order, especially where xerosis and night blindness are prominent symptoms.

The author also mentions the very ancient "liver-treatment" which in his own case was temporarily followed by marked improvement. He quotes the observations of Trantas,¹ who not only in cases of simple night blindness with xerosis but also in two cases of night blindness with severe jaundice, obtained the disappearance of both symptoms after the administration of a daily dose of 200 grammes of sheep's liver—though in the latter two cases the general affection was not improved. Whether the result obtained thereby was accidental or not the author leaves undecided.

K. G.

GALEZOWSKI (Paris). Arterial Thrombosis of the Optic Nerve. *Recueil d'Ophthalmologie*, February to June, 1900.

SACHS (Vienna). Spasm of the Retinal Arteries. *Beiträge zur Augenheilkunde*, pt. 44, 1900.

L. WELT (Geneva). Thrombosis and Embolism of the Central Retinal Artery. *v. Graefe's Archiv für Ophthalmologie*, 41, iv., 1900.

Notwithstanding the numerous occasions on which the clinical sketch of embolism of the retinal artery, first drawn by von Graefe, has been reproduced since then, little of moment has been added to our knowledge of the picture. Cases have from time to time been observed, however, in which though apparently all the clinical features of embolism have been present, yet circulation has been re-established in the retina, and even a certain amount of vision has returned. It cannot be that any collateral

¹ See OPHTHALMIC REVIEW, 1900, p. 50.

circulation has provided the blood supply in the retinal vessels after the occurrence of embolism has choked the central artery, the vascular conditions present in the retina negative any such possibility ; one has to seek some other explanation.

In a series of articles Galezowski discusses these arterial thromboses in a very exhaustive manner, giving full notes of many examples.

In many cases of sudden loss of vision, generally ascribed to embolism, nothing can be found to be wrong with the patient's heart, kidneys, &c. In cases, then, in which the heart and kidneys are sound, it seems probable that the loss of vision is due to a thrombosis of the retinal artery or one of its branches, primarily caused by an endarteritis, peri-arteritis, or other alteration in the capillary vascular system.

This suggestion will explain even the occurrence of those temporary obscurations which not infrequently are complained of for some time before the actual block occurs, for one has only to suppose either that the lumen has in the progress of the disease become temporarily more narrow, or that the heart power is for the time being insufficient to drive the blood through the diminished channel in sufficient quantity ; but even *post-mortem* examination reports must be received with caution, for the thrombus, if found, may be caused by endarteritis, and an endarteritis may quite well be produced locally by the influence of a thrombus.

The arterial alterations, the results of which one sees in the retinal vessels, are of two kinds : the one causes slowly progressive visual troubles, as in albuminuric retinitis ; the other gives rise to sudden and instantaneous phenomena, so that there is immediate loss of sight, as in embolism of the central artery of the retina.

The similarity between these two affections is very great, for in many cases the vessel walls, weakened by pre-existing disease, suddenly give way ; this leads to sudden loss of vision, and on this ground a diagnosis of embolism is often recorded. In a certain proportion of cases, however, nothing can be found in the patient's

general state which could be a cause of embolism, and so one is driven to the conclusion that the cause is local in the eye. In a series of 59 cases tabulated by M. Galezowski, he found 13 which could not be referred to any affection of the heart or aorta.

Regarding the etiology of these cases of thrombosis, gout and rheumatism (especially gonorrhœal rheumatism) form two chief causes by setting up an arterio-sclerosis. The signs of such a degeneration can be seen with the ophthalmoscope, long before the actual thrombosis occurs, in certain narrow white borders to one or other branch of the central retinal artery. Similarly, syphilis and chronic alcoholism may set up an arterio-sclerosis by which a thrombosis may be suddenly caused. In reference to the latter cause, Snell has reported¹ a case of retinal thrombosis in an alcoholic, aged 60, who had no cardiac lesion. Diabetes mellitus, endarteritis proliferans and ophthalmic migraine are also instanced as causes. Regarding the latter, M. Galezowski says that it is not an isolated malady, but is occasioned by many various causes, the main factors of which are the nervous element and arterio-sclerosis. All neuroses have in them the germ of organic lesions, says Charcot, and a migraine, a neurosis at the outset, may in a moment become complicated by, or transformed into, an organic affection. So a prolonged spasm of arteries, already diseased, may at a given moment obliterate them and interrupt the arterial circulation of a corresponding part of the retina.

The symptomatology of these cases of thrombosis deserves some attention as aiding in diagnosis. The actual onset of the thrombosis is, of course, marked by a sudden loss of vision followed or accompanied by an infiltration and serous effusion round the disc (perhaps the macula), hæmorrhages and venous stasis, and finally a true optic neuritis. Before, however, the actual thrombosis occurs there are certain prodromal symptoms, and on these M. Galezowski lays great stress as affording a means of diagnosis between

¹ *Lancet*, December, 1899.

thrombosis and embolism. Briefly put, these prodromal symptoms are: (1) A temporary central scotoma, usually following an effort or some access of emotion, lasting for an hour, a day, or even longer, but completely disappearing. In such cases the narrow white borders to the arteries may be seen—a sign of arterio-sclerosis. (2) Dyschromatopsia, so that certain colours (especially green, red and violet) are seen with difficulty. This also is a sign of optic atrophy, but it is to be noted that the acuity of colour-vision is quite normal so long as the object is near the eye, though it is lost if the object be far removed from the eye. (3) *Mouches volantes*—these appear very often before the thrombosis and are the result of a partial anæsthesia of the retina, which is not properly nourished owing to the difficulty in the circulation.

Other symptoms are: orbital pains and flashes of light before the eye accompanied by a feeling of weight and weariness in it.

As a contribution to the literature of the subject Sachs presents the following record of a case:—

A man, aged 64, presented himself in October, 1899, stating that the previous day he had suddenly become quite blind of the left eye. During a few months preceding he had suffered from occasional obscurations of vision in that eye, which, however, were of very brief duration. On examination, Sachs found the left eye to possess light perception, but only in the upper portion of the field was projection present. Ophthalmoscopically, the appearances presented in a case of embolism were manifest: the disc was pale, with obscured margins; the retina, especially in the neighbourhood of the disc and macula, was greyish-white. The vessels were extremely narrow, lost to view in some parts where the retina was thickened, and the superior temporal artery exhibited the broken blood column so often described. Sachs now noticed that in the descending vein pulsation was visible just at the margin of the physiological cup, which led him to observe with great care the precise condition of the circulation in the corresponding artery. This vessel ran without division until

beyond the disc margin, and the main stem and first part of each of the branches was normal in aspect ; but what attracted the attention on patient examination was that from the point of origin in the cup a ring of constriction could be seen to take its rise, run along the vessel to its point of division and pass away, to be rapidly succeeded by another. The blood-column in the artery, though much narrowed, did not appear to be entirely obliterated at the situation of the ring for the time being, and these waves of constriction succeeded one another with great irregularity—at one time two waves would be visible almost at the same moment, at another more than half a minute would pass ere another showed itself at the edge of the cup.

The movement of this ring was slow, for it would take three to five seconds to travel all the distance over which it could be followed, amounting to about one half disc diameter. It appears certain that the phenomenon was due to spasm of the artery.

Others have recorded from time to time cases of recurrent obscurations of sight with visible diminution of vessels in the fundus, in some cases along with hemicrania, but this visible travelling spasm seems unique, it only lasted a short time, for when the patient returned in a day or two it was no longer to be made out.

It may be objected that Fischer has asserted that the retinal artery no longer possesses a muscular coat after passing through the lamina cribrosa, and therefore that spasm of the wall is impossible ; but this opinion seems to have been founded upon an error of observation.

Treatment of all those interferences with circulation should be both general and local. Salicylate of soda (60 grains) and salicylate of lithine (30 to 60 grains per diem) have been found especially useful in cases of simple or blennorrhagic arthritis. Locally, Galezowski commends the use of alternate hot and cold applications to the eye (for the carrying out of which he has invented a special bag) in order to set going the circulation, and alternate instillations of scopolamine and eserine with the same object.

FRANK C. CRAWLEY.

SIEGRIST (Basel). The Dangers to Vision and to Life by Ligature of the Carotid Artery in Man.
von Graefe's Archiv für Ophthalmologie, l. 3, 1900.

Siegrist having had under his observation two cases in which ligature of the common carotid was followed by blindness of the eye of the same side, has set himself to examine under what conditions the operation is likely to be dangerous to vision.

Ligature of the common carotid in animals causes temporary blanching of the eye and reduction of the intra-ocular pressure, followed by complete return to normal. Very possibly this is what would occur in a perfectly healthy man; but as the conditions under which the operation would be performed are always more or less pathological, we must have recourse for practical information to the records of clinical experience. Siegrist has accordingly collected all published cases of ligature of the common carotid from the year 1800 to the year 1897—997 cases in all. Among these there were 42 which were followed by disturbance of some kind or other in the corresponding eye. Of the 42, 9 were cases of suppuration of the eyeball secondary to suppuration of the wound, and cannot be regarded as effects of ligature of the carotid.

Eight cases presented prolonged or permanent impairment of vision of the corresponding eye, but the cause of the loss of vision must remain uncertain, as none of the cases were completely investigated; in 2 in which an ophthalmoscopic examination was made the result was negative.

In 14 cases there was temporary impairment of vision with more or less rapid recovery. Most of these cases occurred in comparatively young patients, and nearly all of them had suffered severely from loss of blood, either at the operation or from a previous wound which rendered the operation necessary, and Siegrist considers that the loss of sight was probably due to temporary failure of the circulation in the eyeball.

In one or two instances, as in the experiments on

animals, a passing pallor of the disc and narrowing of the retinal arteries were observed.

In 2 cases there was corneal trouble, probably neuro-paralytic in its origin, from interference with the blood supply of the Gasserian ganglion.

Five were cases of strabismus. This symptom is almost always an indication of extensive cerebral lesion. Four of the 5 were fatal.

Siegrist's own cases were as follows:—

Case 1.—A man of 47 was operated on for cancer of the tongue, the external carotid artery being tied as a preliminary measure. All went well till the eighth day, when secondary hæmorrhage occurred, for which the common and internal carotids were tied. On the same day there was total loss of vision of the eye on the same side, and the typical appearances of embolism of the central artery of the retina were present. Three days later signs of recommencing retinal circulation were visible, namely, a continuous, moderately rapid procession of the broken blood columns in the retinal vessels, centrifugally in the arteries, centripetally in the veins; at the same time there was some clearing of the retinal opacity. The next day, however, with increasing collapse of the patient, the retinal circulation had again ceased. Death occurred the same night. The *post-mortem* examination showed thrombosis of the internal carotid artery extending into the circle of Willis. The arteria centralis retinæ was blocked near its origin by an embolus, from which recent thrombus extended as far as the entrance of the artery into the optic nerve, but no further. Microscopic examination of the embolus showed that it was becoming organised by proliferation of the endothelium into it. It evidently corresponded in date with the sudden loss of vision, and was probably a portion of the clot formed in the external carotid artery after the first operation, which had been detached at the second.

The cornea presented in its central part an area of infiltration and partial breaking down of the tissue, which from its microscopical characters Siegrist regards as due to keratitis neuroparalytica.

Case 2 was that of a young and healthy man who became the subject of exophthalmus pulsans after a fall. The external and internal carotids were tied simultaneously. The next day impairment of vision of the corresponding eye was complained of; ophthalmoscopically the papilla was slightly pale, the arteries small, the veins full; there was some haze of retina in the central region. Vision became gradually worse, and when Siegrist saw him five months later the eye had been blind for some time. The fundus now presented a remarkable aspect: the disc was white, the vessels reduced to threads, visible only on the disc, and the whole extent of the choroid was sprinkled with fine pigment flecks. The large choroidal vessels were everywhere visible and in places were pale and sclerotic looking. A year and a half later large areas of the fundus showed nothing but completely sclerosed choroidal vessels; where the normal red colour was still present the pigment was present also, but now it was aggregated into clumps. No retinal vessels were visible even on the disc. A similar pigmentation of the fundus is known to occur after experimental ligature of the ciliary vessels in animals, and after rupture of the same vessels in man. It seems probable that the cause of the appearances in this case was a thrombosis spreading from the arterio-venous aneurysm to the ophthalmic artery.

In the last portion of his paper Siegrist discusses the question of the danger to life of ligature of the common carotid. A mortality of nearly 50 per cent. as shown by the earlier statistics, or even of 20 per cent. as shown by later ones, might well give one pause before advising the operation in any condition which is not desperate as regards the life of the patient. But an analysis of the causes of death in the fatal cases shows that considerably over one half of them arose from causes independent of the ligature itself, such as infection of the wound, secondary hæmorrhage, or intercurrent disease. In the remaining cases, in which the death of the patient must be attributed to the operation, it is notable that in practically all of them one or other of the following conditions was present: wide-

spread arterial disease, heart mischief, advanced age, or a weak and cachectic condition of the patient. If the blood supply to the brain is to be kept up when one of the four main channels is suddenly blocked, a correspondingly increased effort must be made on the part of the heart, and it is obvious that the causes just mentioned are such as would interfere with the response to the increased demand. Siegrist would therefore look on the condition of the heart as of predominating importance in the prognosis as to life in this operation.

In patients suffering from exophthalmus pulsans, which is practically the only disease in which the ophthalmic surgeon is likely to resort to ligature of the carotid, the action of the heart is not usually compromised; and examining the statistics with regard to this condition alone, we find that in 113 cases of ligature of the carotid for exophthalmus pulsans there were 10 deaths. Excluding cases of infection of the wound there were 108 cases with 5 deaths; excluding patients over 60 years of age, 105 cases with two deaths, or a mortality of somewhat less than 2 per cent.

W. G. L.

F. SCHIECK (Halle). Clinical and Experimental Studies on the Effect of Tuberculin in Tubercle of Iris. *v. Graefe's Archiv f. Ophthalmologie*, l. 2, 1900.

Moved by the circumstance that tuberculin T.R. sets up a much weaker reaction than the original tuberculin, with consequent less risk of generalising the tuberculous process, and that its use in lung cases has sometimes been beneficial and never harmful, Schieck has employed it as well as the original tuberculin, in corneal and iris-tubercle, and records his results in the present paper. He made use of the two kinds of tuberculin in five cases. In these the effect of the injections in causing nodules on the iris to disappear, ordinary treatment proving ineffectual, was very

striking; improvement set in as a rule immediately on injections being begun, but in cases 3 and 4 the immediate effect was apparently to increase the intensity of the symptoms, though this was followed by subsidence and recovery.

He began with a dose of 0.05 mg. (or 0.1) by weight, of the dried original tuberculin, and this was increased on alternate days by 0.05 mg. (or 0.1), and continued according to effect, until 5 mg. were given as a dose. In case 2 he went up to a dose of 18 mg. With T.R. tuberculin he began with 0.002 mg., increased on alternate days by 0.001 mg. Why a smaller dose of T.R. should be selected is not clear, inasmuch as it is weaker than the original tuberculin.

Schieck quotes six other cases treated by other observers, in all of which similar favourable results were obtained, that is to say, phthisis bulbi did not ensue, the shape of the eye was retained, and some amount of sight; and in none was the general health prejudicially affected by the treatment. He is of opinion that it should be tried in all cases of iris-tubercle before proceeding to excision. Apparent increase, at first, of the symptoms under the use of the injections should not daunt one too much. If relapses take place, the courses of injections must be repeated. The results so far published are claimed by Schieck to be much more favourable than those obtained by excision of the nodules—as recommended by de Wecker and others; moreover, dissemination has followed attempts at excision in some cases. Schieck also experimented on rabbits to see the effect of tuberculin T.R. on artificially induced iris- and corneal-tuberculosis, and details his experiments (six series) and reviews those which had been performed up to date with the old tuberculin. The results are not uniform, but speaking generally, the course of the disease was rendered more favourable in those rabbits in which injections were made, as compared with those not so treated; on the other hand, it is clear that spontaneous healing of tubercle of iris in rabbits can occur. He sums up as regards the experiments on rabbits as follows:—

(1) T.R. tuberculin has no immunising effect.

(2) It is not able in every case of experimentally induced tuberculous disease of cornea and iris to bring about healing.

(3) At all events the course of the disease is not unfavourably affected.

(4) Recovery may occur without the use of tuberculin, especially if the pupil has become excluded and occluded ; this leads to alteration in the nutrition of the anterior parts of the eye, and the tubercle bacillus no longer thrives.

Finally, Schieck contrasts the favourable influence which tuberculin has in iris-tuberculosis in man with the uncertain influence it has in rabbits, and offers this explanation ; in the former, tubercle bacilli are scanty and the inflammation is endogenous and leads to the formation of nodules in the iris tissue, whilst the experimental iris-tuberculosis is due to masses of bacilli lying free on the surface of the iris. Now the effect of tuberculin is to stimulate the implicated tissue to react and ultimately form scar-tissue around the included bacilli, and this reaction is much more effective when the bacilli are few in number and within the iris tissue, than when they are more numerous and superficial.

W. WATSON GRIFFIN.

SWANZY. *Handbook of Diseases of the Eye.*
Seventh Edition, 1900. London: H. K. Lewis.

Mr. Swanzy's admirable text book has now appeared in a seventh edition, a fact which speaks for itself of the excellence of the work. In this edition the chief, though not the only, improvement has been the introduction of a description of the method of employing Röntgen rays for the localisation of foreign bodies within the eye. "Swanzy" is a work whose chief merits seem to us to be clear teaching without dogmatism, scientific accuracy without pedantry, a true sense of proportion, and ripe

experience united to open-mindedness ; it has many rivals, but few, if any, equals. The section dealing with the relation of eye symptoms to diseases of the brain and other parts is worthy of special commendation.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, NOVEMBER 8, 1900.

G. ANDERSON CRITCHETT, M.D., F.R.C.S.Edin., President,
in the Chair.

The Determination of the Influence of the Eye-ball on the Growth of the Orbit by Experimental Enucleation of one Eye in young animals.—Dr. W. E. Thomson. The experiments described consisted in the enucleation under ether of one eye in young rabbits about 20 days old. In every case when the animal survived it was found that the dimensions of the orbit on the anophthalmic side were less, as the animal grew up, than on the sound side. At the age of 6 or 8 months the animals had been killed and careful measurements taken on the two sides, both in the "wet" (including soft parts), and in the "dry" condition (without soft parts). The main part of the diminution was caused by the bones, and existed in each dimension of the orbit. The paper was illustrated by lantern slides and by skulls of the animals experimented on, which latter displayed the deformity very strikingly. The author said that it was his intention to continue his research by experiments on monkeys.

The President remarked that the paper was important, and that a practical outcome of it was to show the desirability of employing artificial eyes in young children on whom it had been necessary to perform the operation of excision.

Mr. Gruber said he thought that the influence of the muscles of the orbit on its development was very important.

Ætiology of Lamellar Cataract.—Mr. Norman G. Bennett. In this paper, by a careful examination of the changes which are found in the permanent teeth in cases of lamellar cataract, and by arguments concerning the dates at which these changes are produced, the problem was reopened whether the changes which constitute lamellar cataract take place before or after birth. The fact had been established, said the author, that the opaque zone

was never larger than the lens at the time of birth, and from this Mr. Treacher Collins had argued in 1894, that either the lesion is produced before birth or else the part affected is not the most peripheral at the time of its occurrence.

The dental lesions associated with lamellar cataract were caused by imperfect calcification of the enamel, and to some extent of the dentine. "Any cause tending to inhibit calcification during the first three years of life might be expected to show its effects on some parts of the crowns of the first permanent molars, and in corresponding parts synchronously calcified of the incisors, cuspids, and bicuspid. Any cause operating later than the second year might affect either these latter or the second permanent molars." Turning to his own cases of lamellar cataract the author found that in twenty-two out of twenty-five the teeth were affected. In all these the first permanent molars were affected on their coronal surfaces, and more or less on the labial and lingual surfaces—the epoch of remission being very clearly indicated by a definite line of demarcation between the bad enamel and the good. In the majority of first permanent molars of all cases the coronal cusps stood up as spikes, distinct from the rest of the crown, strongly indicating that the disease attains its maximum intensity not until after these are formed. The incisors and cuspids showed hypoplasia of enamel to an extent chronologically in accord with that shown by the first permanent molars. In three cases only were there any marks on the bicuspid to be noticed. In no case was a second permanent molar affected. Whatever might be the extent of variability of the date of remission, the transition to normal enamel was nearly always sudden. The onset, on the other hand, showed no such narrowly-defined epoch. From these data the author argued that lamellar cataract is a disease not of uterine, but of early infantile life. He then went on to discuss its relationship to rickets. In his opinion rickets, rather than being a cause of lamellar cataract, was a result of the same general condition which produced it; and in support of this view he said that in many cases of rickets the deciduous teeth which are calcified before birth are deficient in enamel, whereas, in cases of lamellar cataract, this was very seldom the case. The condition of hypoplastic teeth was by no means an uncommon one among the less well-cared-for classes, but the particular form of hypoplasia which was associated with lamellar cataract was far less frequent. Its association with eruptive fevers was then touched upon, and the author summed up by saying that the probable cause was "some

general derangement of health" (occurring in early infantile life) "which also affects the teeth, the most probable being errors of feeding and nutrition." To reconcile this conclusion with the observations about the measurements of the opaque zone in the lens, Mr. Collins's opinion was quoted to the effect that, as a result of some general disturbance of nutrition, it was likely that the part of the lens furthest from the nutrient supply should contract, and as a result of such contraction, that an opaque zone should be formed between the nucleus and the cortex. The ocular lesion, therefore, differed from the dental in being produced after the development of the tissue instead of during that process.

The President asked whether Mr. Bennett had inquired into the family history in his cases, and mentioned a family in which no less than thirteen members had been affected with lamellar cataract.

Mr. Grimsdale, who had supplied Mr. Bennett with some of his cases, said that in one instance they had been able to trace lamellar cataract through three generations.

Mr. Treacher Collins quite agreed with Mr. Bennett's conclusions and said that for some years he had been comparing the teeth in cases of lamellar cataract with those in cases of cataract which were definitely congenital. He had examined ten of the latter, in not one of which did the deficiency of enamel resemble what was seen in cases of lamellar cataract.

Mr. Griffith disagreed with Mr. Bennett's conclusions. The cells for the formation of the enamel were laid down as early as the sixteenth week of foetal life, and he thought it more probable that lamellar cataract was due to a defect in these cells than to a defect in calcification.

Mr. Bennett, in reply, said, that if the cells were injured at this early period they would never produce any normal enamel at all, whereas, in point of fact, a portion of the enamel was nearly always perfectly normal.

CARD SPECIMENS.

Primary Chancre of the Retro-tarsal Fold of the Upper Lid.—Mr. A. W. Ormond. The President, in commenting on this case, remarked on the possibility of infection through the uncleanly methods in popular vogue for removal of foreign bodies from the cornea.

Epithelioma of the Cornea.—Mr. Simeon Snell.

Osteo-Sarcoma of the Orbit.—Mr. John Griffith. These two latter were microscopical specimens.

Case of Bullet-wound of Orbit followed by Blindness of both Eyes.—Mr. Treacher Collins. This was the case of a seaman with Admiral Seymour's relief force in China. He was shot through the head with a bullet and after lying unconscious for a month recovered, but with total loss of sight in both eyes. On the right cheek there was a scar $1\frac{1}{2}$ inches long, an inch or more below the orbital margin. The wound of exit was small and hardly noticeable, two inches above the zygoma and midway between the outer margin of the orbit and the external ear. In the right eye the movements were normal and there was optic atrophy with two choroidal ruptures, the position of which illustrated what Mr. Nettleship said on this subject in his paper at the last meeting of the Society. In the left eye the movements were impaired, and there was a large white mass obscuring the disc and greater part of the fundus, with a bright patch of blood on its surface. Beyond this mass in same direction, a detached retina could be made out.

LETTER TO THE EDITOR.

SIR,—My attention was called to an article in your columns by Prof. Trantas, of Constantinople, on the "Treatment of Night Blindness by Ingestion of Liver." This treatment is as old as Hippocrates, but is not mentioned in any recent text-books (*e.g.*, Swanzy's new Seventh Edition, which I have at hand). I have tried this treatment on a large number of genuine night-blindness cases in the Central Prison at Bhagalpur, Bengal, and can testify to the very rapid and prompt nature of the cure. Within a week or ten days the worst cases see as clearly at night as a healthy normal person. I have, after carefully testing the genuineness of the cases, put them on goats' liver, 8 ozs. daily, fried with oil and spices, and the improvement has been in every case immediate. I have now tested about 20 cases and will do so with more. I am informed that cod-liver oil with turpentine (M v.) is an equally good treatment, but have not yet tried it. The liver treatment is well known to natives of India, but I have never heard of it being properly tested before. Xerosis of the conjunctiva was also present in most cases.

Yours faithfully,

W. J. BUCHANAN, B.A., M.B.,

Major, I.M.S.,

October, 1900.

Editor, "Indian Medical Gazette."

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The Ophthalmic review

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